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FIELD SAMPLING REPORT

Soil, Ground Water, Surface Water, Sediment, and Air Sampling Field Sampling Report Sauget Area 1 – Volume 1 of 9

Remediation Technology Group
Solutia Inc.
St. Louis, Missouri

September 2000

O'BRIEN & GERE
ENGINEERS, INC.

10040/23548

FIELD SAMPLING REPORT

Soil, Ground Water, Surface Water, Sediment, and Air Sampling Field Sampling Report Sauget Area 1 – Volume 1-9

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Solutia Inc.
St. Louis, Missouri

Robert J. Januska, P.E.
Vice President

September 2000

O'BRIEN & GERE ENGINEERS, INC.

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Contents

Volume 1

Volume 2

Volume 3

Volume 4

*Sections provided by Menzie-Cura.

List of Tables

List of Figures

List of Appendices

Executive Summary

The January 21, 1999 Administrative Order on Consent (AOC) Scope of Work identified the site characterization information needed to define the extent of contamination at Sauget Area 1 for purposes of implementing a removal action on the source areas and Dead Creek and for implementing a remedial action for ground water. In addition, an analysis of currently available data was done to determine the areas of the site that required characterization data in order to define the extent of contamination. The 1999 Support Sampling Plan (SSP) was developed for purposes of meeting the January 21, 1999 AOC Scope of Work.

This Field Sampling Report (FSR) has been prepared by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on behalf of Solutia Inc. (Solutia) as a result of implementing the SSP at the Sauget Area 1 site (the site) located along Dead Creek in the Villages of Sauget and Cahokia, Illinois. The purpose of the SSP was to gather sufficient information from the site to identify the nature of waste materials in Sites G, H, I, L, M, and N and to assess the extent of constituent migration in soil, ground water, surface water, sediments, and air at the site. This FSR details the procedural activities implemented for field sampling, sample handling and storage, chain of custody, and field analysis efforts associated with sampling of environmental media at the site and is one component of the Engineering Evaluation/Cost Assessment (EE/CA) and Remedial Investigation/Feasibility Study (RI/FS). The activities described in this FSR were performed in accordance with O'Brien & Gere's Field Sampling Plan (FSP) dated June 1999, O'Brien & Gere's Health & Safety Plan dated April 1999, and O'Brien & Gere's Quality Assurance Project Plan dated April 1999.

The SSP began field work in September 1999 and completed field work in July 2000. During the course of implementing the SSP, there were 25 change orders, 15 deviations, and 4 clarifications to the 1999 SSP. The field team consisted of representatives from each of the following interested parties: Solutia; U.S. Environmental Protection Agency (USEPA); O'Brien & Gere; Menzie-Cura & Associates, Inc.; and Maverick, Inc. The field team was present at Sauget Area 1, in general, throughout the course of the field work.

The site description is presented in Section III of the AOC (USEPA, 1999). Sauget Area 1 is located in the Villages of Sauget and Cahokia, St. Clair County, Illinois. The study area is centered on Dead Creek, an intermittent stream that is approximately 17,000 feet long, and its

floodplain. The study area includes three closed municipal/industrial landfills (Sites G, H, and I), one backfilled wastewater impoundment (Site L), one flooded borrow pit (Site M), and one backfilled borrow pit (Site N). The study area also includes six creek segments:

- Creek Segment A – Alton and Southern Railroad to Queeny Avenue
- Creek Segment B – Queeny Avenue to Judith Lane
- Creek Segment C – Judith Lane to Cahokia Street
- Creek Segment D – Cahokia Street to Jerome Lane
- Creek Segment E – Jerome Lane to Route 157
- Creek Segment F – Route 157 to Old Prairie duPont Creek

These sites and creek segments are shown on Figures 1 and 18 through 34, respectively.

Due to this report's size and compilation of 30 large and distinct sampling procedures, reviewing and discussing these procedures prior to preparing an EE/CA or RI/FS is paramount to efficiently completing the next reports for Sauget Area 1. This FSR consists of 30 sampling procedures that generated 136 soil samples, 201 ground water samples, 13 air samples, 130 sediment samples, 20 surface water samples, 65 soil gas samples, 543 magnetometer readings, 15 ground water slug tests, 233 geotechnical samples, and 28 trenches. The intention of providing this report is to obtain concurrence among the interested parties for the sampling procedures implemented. Obtaining concurrence among interested parties prior to preparing the EE/CA and RI/FS will facilitate efficient use of the data generated from implementing the procedures contained in this report.

This FSR is not intended to provide inferences, interpretations, or conclusions regarding human health risks or remedial actions for the media sampled. This FSR does not contain chemical analytical data, chemical data figures, chemical data validation results, risk assessment calculations, or remedial action evaluations. This FSR does not provide recommendations regarding health risks, ecological risks, or remedial actions for the media sampled.

This FSR includes procedural summaries for 30 sampling tasks. These 30 sampling tasks can be grouped into eight general categories:

- waste characterization
  - past disposal practices
  - waste depths and volumes
  - extent of cover over fill areas
  - soil gas survey on and around fill areas
  - buried drum and tank identification
  - magnetometer survey

- hydrogeology
  - degree of hazard and mobility of constituents

  - discharge and recharge areas
  - regional and local flow direction and quality
  - local uses of groundwater
  - horizontal and vertical distribution of constituents
  - slug tests
  - grain-size analyses
  - upgradient and downgradient samples
  - bedrock

- soil
  - extent of contamination of surface and subsurface soils
  - leachate samples from fill areas
  - soil sampling of residential/commercial areas adjacent to Dead Creek

- sediment
  - extent and depth of contamination in sediments

- surface water
  - areas of surface water contamination in Dead Creek and its tributaries and surrounding wetland areas

- air
  - tendency of constituents to enter the atmosphere
  - tendency of constituents to enter local wind patterns
  - degree of hazard

- ecological assessment
  - affected ecosystem description
  - evaluation of toxicity
  - assessment of endpoint organisms
  - exposure pathways
  - toxicity testing or trapping

- pilot treatability tests
  - waste incineration
  - leachate treatment.

This FSR details the procedures implemented to complete the 30 tasks. These procedural descriptions include 30 change orders, 15 deviations, and 4 clarifications to the 1999 SSP. The "Executive Summary Table" includes the total number of samples collected per task.

Sample area or sample media can be used to describe the 30 procedures/ tasks implemented. Sample areas could include fill areas, creeks, fields adjacent to creeks, regional ground water (greater than 30 feet from the surface), shallow/leachate ground water (less than 30 feet from the surface), domestic areas, and air. Sample media could include soil, regional ground water, shallow/leachate ground water, sediment, surface water, air, and waste. The "Executive Summary Table" includes the total number of samples collected per sample area and sample media.

This FSR will be used to complete both the RI/FS and EE/CA report. These reports are scheduled to be complete in 2001. This FSR will be used by others to prepare a Human Health Risk Assessment; an Ecological Risk Assessment; and EE/CA for soil, surface water, sediments, and air; an RI/FS for ground water. Completion of the review and subsequent understanding/concurrence of the 30 procedures will facilitate the initiation of developing both the RI/FS and EE/CA report.

Solutia Sauget Area 1
SSP Sampling Summary

FSR Section	Matrix/Media	Number of Environmental Samples*	Fill Area G	Fill Area H	Fill Area I	Fill Area L	Fill Area M	Fill Area N	Creek Segment B	Creek Segment C	Creek Segment D	Creek Segment E	Creek Segment F	Fields Adjacent to Creeks	Regional Ground Water	Shallow/Leachate Ground Water	Domestic Areas	Air
	Boundary Test Trenches																	
3.1	Test Trenches	22	7	4	2	5		4										
	Soil Gas Survey																	
3.2	Soil Gas Points	65	12	18	22	11		2										
	Waste	49																
3.3	Composite Borings	25	5	5	5	5		5										
3.3	Discrete Surface	20	4	4	4	4		4										
3.3	Sediment	4					4											
	Magnetometer Survey																	
3.4	Magnetometer Readings	543	77	106	255	19		86										
	Interior Trenches																	
3.5	Interior Trenches	6	1	1	2	1		1										
	Ground Water	201																
3.6	Piezometers	27													18	9		
3.7	Fill Area	19	8	4	4	3									3	16		
3.8	Alluvial Aquifer	11		6	5										11			
3.9	Downgradient Alluvial Aquifer	89													71	18		
3.10	Bedrock	3	1	1	1										3			
3.11	Shallow Residential	6													2	4	6	
3.12	Time Series	6													6		6	
3.13	Domestic Well	4															4	
3.14	Slug Tests	15													10	5		
3.15	Grain-Size Analysis	15																
3.16	Upgradient	9																
	Soil	136																
3.17	Undeveloped Area Surface Soil	45												45				
3.17	Undeveloped Area Subsurface Soil	45												45				
3.18	Developed Area Surface Soil	20															20	
3.18	Developed Area Subsurface Soil	20															20	
3.19	Background	6															6	
	Sediment	130																
3.20	Undeveloped Area (Industry Specific)	50							10				40					
3.20	Developed Area (Industry Specific)	47								12	9	26						
3.20	Borrow Pit Lake (Industry Specific)	8																
3.20	Dead Creek (Full Scan)	2																
3.20	Ecological/Borrow Pit Lake Eco (Full Scan)	23					1		3	3	3	3	3	4				
	Surface Water	20																
3.21	Surface Water	20					1		3		3	1	3					
	Air	13																
3.22	Air	13	4	3	3	3												13
	Pilot Test	2																
3.23	Waste Incineration	1																
3.23	Leachate Treatment	1																

Source - Soil, Ground Water, Surface Water, Sediment, and Air Field Sampling Plan, Sauget Area 1 Sampling Support Plan, Sauget and Cahokia, IL Vol 2A, 6/99 (FSP)

**Number of Associated Quality Control Samples (DUPs, EBs, TBs, and MS/MSDs) can be found in Tables 1-23 of the FSP.*

Section 1

1. Project Scope and Objectives

The purpose of the June 1999 Support Sampling Plan (SSP) is to gather sufficient information from the Sauget Area 1 Site to identify the nature of waste materials in Sites G, H, I, L, M, and N and to assess the extent of constituent migration in soil, ground water, surface water, sediments, and air at the site.

Collected data will be used by others to prepare a Human Health Risk Assessment (HHRA); an Ecological Risk Assessment (ERA); an engineering evaluation/cost assessment (EE/CA) for soil, surface water, sediments, and air; and a remedial investigation/feasibility study (RI/FS) for ground water. The EE/CA and RI/FS SSP (Solutia Inc. [Solutia], 1999) and the Field Sampling Plan (FSP) include a description of the sample media, sample locations, number of samples, and analytical methods.

The main components of the SSP addressed in this Field Sampling Report (FSR) include:

- source area sampling (soil gas sampling, waste sampling, and buried drum and tank identification)
- ground water sampling (upgradient, fill areas, downgradient alluvial aquifer, bedrock, domestic wells, slug tests, and grain-size analysis)
- soil sampling (undeveloped areas, developed areas, and background)
- sediment sampling (undeveloped areas, developed areas, Borrow Pit Lake, and Dead Creek)
- surface water sampling
- air sampling
- pilot test sampling.

Site plans showing sampling locations are located on the separately bound figures of this FSR.

1.1. Site Characterization

The January 21, 1999 Administrative Order on Consent (AOC) Scope of Work (SOW) identified the site characterization information needed to define the extent of contamination at Sauget Area 1 for purposes of implementing a removal action on the source areas and Dead Creek and for implementing a remedial action for ground water. In addition, an analysis of currently available data was done to determine the areas of the site that required characterization data in order to define the extent of contamination for purposes of implementing a removal action on the source areas and Dead Creek and for implementing a remedial action for ground water.

Sections 5 to 12 of the SSP and Section 5 of the FSP address activities designed to provide site characterization data. These sections describe the number, types, and locations of additional samples that will be collected as part of the SSP.

1.1.1. Waste Characterization

The AOC SOW requires inclusion of a program in the SSP for characterizing the waste materials at the site including an analysis of current information/data on past disposal practices, test pits/trenches, and deep soil borings to determine waste depths and volume and extent of cover over fill areas, soil gas surveys on and around fill areas, and geophysical delineation of potential hot spot drum removal areas. Based on the AOC SOW requirements; meetings; telephone conversations with the U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), Weston, and Illinois Environmental Protection Agency (IEPA); and a review of the 1998 Ecology and Environment report, the identified waste characterization data include:

- past disposal practices
- waste depths and volumes
- extent of cover over fill areas
- soil gas survey on and around fill areas
- magnetometer survey
- buried drum and tank identification.

Section 5 of the SSP, Waste Characterization Sampling Plan, describes the work that was performed to obtain waste characterization data. This corresponds to Sections 5.1 to 5.5 of the FSP.

1.1.2. Hydrogeology

The AOC SOW requires inclusion of a program in the SSP for performing a hydrogeologic investigation at the site including assessment of the degree of hazard, regional and local flow direction and quality, and local uses of ground water. In addition, the SSP was required to develop a strategy for determining horizontal and vertical distribution of contaminants and to include slug tests, grain-size analyses, and upgradient samples. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, the identified ground water characterization data include:

- degree of hazard and mobility of constituents
- discharge and recharge areas
- regional and local flow direction and quality
- local uses of groundwater
- horizontal and vertical distribution of constituents
- slug tests
- grain-size analyses
- upgradient samples
- downgradient samples.

Section 6 of the SSP, Ground Water Sampling Plan, describes the work that was performed to obtain ground water characterization data. This corresponds to Sections 5.6 to 5.16 of the FSP.

1.1.3. Soil

The AOC SOW requires inclusion of a program in the SSP for performing a soil investigation at the site to determine the extent of contamination of surface and subsurface soils. Sampling of leachate from the fill areas and sampling of soil in commercial/open areas adjacent to Dead Creek were also required. The AOC SOW indicated that residential soil sampling may also be required depending on the results from the commercial/open area sampling. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, soil characterization data include:

- extent of contamination of surface and subsurface soils

- leachate samples from fill areas
- soil sampling of residential/commercial areas adjacent to Dead Creek.

Section 7 of the SSP, Soil Sampling Plan, describes the work that was performed to obtain soil characterization data. This corresponds to Sections 5.17 to 5.19 of the FSP.

1.1.4. Sediment

The AOC SOW requires inclusion of a program in the SSP for performing a sediment investigation at the site to determine the extent and depth of contaminated sediments in all segments of Dead Creek and its tributaries and surrounding wetland areas. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, sediment characterization data include:

- extent and depth of contamination in sediments.

Section 8 of the SSP, Sediment Sampling Plan, describes the work that was performed to obtain soil characterization data. This corresponds to Section 5.20 of the FSP.

1.1.5. Surface Water

The AOC SOW requires inclusion of a program in the SSP to determine the areas of surface water contamination in Dead Creek and its tributaries and surrounding wetland areas. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, surface water characterization data include:

- areas of surface water contamination in Dead Creek and its tributaries and surrounding wetland areas.

Section 9 of the SSP, Surface Water Sampling Plan, describes the work that was performed to obtain surface water characterization data. This corresponds to Section 5.21 of the FSP.

1.1.6. Air

The AOC SOW requires inclusion of a program in the SSP to determine the extent of atmospheric contamination from the various source areas at the site and to address the tendency of substances identified through waste characterization to enter the atmosphere, local wind patterns, and their degree of hazard. Based on the AOC SOW requirements; meetings;

telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, air characterization data include:

- tendency of constituents to enter the atmosphere
- tendency of constituents to enter local wind patterns
- degree of hazard.

Section 10 of the SSP, Air Sampling Plan, describes the work that was performed to obtain air characterization data. This corresponds to Section 5.22 of the FSP.

1.1.7. Ecological Assessment

The AOC SOW requires inclusion of a program in the SSP to collect data for the purpose of assessing the impact, if any, to aquatic and terrestrial ecosystems within and adjacent to Sauget Area 1 resulting from the disposal, release, and migration of contaminants. This program must include a description of ecosystems affected, an evaluation of toxicity, an assessment of endpoint organisms, and exposure pathways. It also must include a description of toxicity testing or trapping to be done as part of the assessment. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of the 1998 Ecology and Environment Report, ecological characterization data include:

- affected ecosystem description
- evaluation of toxicity
- assessment of endpoint organisms
- exposure pathways
- toxicity testing or trapping.

Section 11 of the SSP, Ecological Assessment Sampling Plan, describes the work that was performed to obtain data for the ecological assessment.

1.1.8. Pilot Treatability Tests

The AOC SOW requires inclusion of a program in the SSP for any pilot tests necessary to determine the implementability and effectiveness of technologies where sufficient information is not otherwise available. Based on the AOC SOW requirements; meetings; telephone conversations with USEPA, USACE, Weston, and IEPA; and a review of

the 1998 Ecology and Environment Report, pilot treatability tests include:

- waste incineration
- leachate treatment.

Section 12 of the SSP, Pilot Treatability Test Sampling Plan, describes the work that was performed for these pilot treatability tests. This corresponds to Section 5.23 of the FSP.

1.2. Change Orders, Deviations, Clarifications

During the course of implementing the 1999 FSP, there were 30 change orders, 15 deviations, and 4 clarifications prepared and submitted. Of the 30 change orders submitted, 25 were implemented. All deviations and clarifications were implemented. The tables below summarize the change orders, deviations, and clarifications.

Table 1 *Change Orders – Solutia – Sauget Area 1*

Change Order Number	Brief Description	Pertinent FSP Section	Deviation Submitted	Clarification Submitted
1*	Addition of three (3) surface water samples to bring total from 20 to 23 to support ecological sampling	5.21		
2	At the request of the ENSR and with concurrence from Solutia Inc., on September 16, 1999, the following physical analysis was requested to be performed on surface soils to support the Human Health RA: soil bulk density, soil-specific gravity, moisture content, and pH.	5.3, 5.17, 5.18, and 5.19		
3	Installation of extra middle boring at middle point of fill areas	5.3	X	
4	Eight existing fill area ground water sample locations need to be re-established via installation of a temporary push probe to collect required samples.	5.7		
5	An inadequate amount or no water was able to be collected using conventional push probe technology for the upgradient alluvial aquifer sampling task at EE-20, EE-04 (100-foot depth), and EEG-108.	5.16		X
6	Addition of 75 magnetometer survey points to bring total from 468 to 543 to support interior trenching tank	5.4		
7	Additional mobilization/demobilization required for Site N waste borings.	5.3		
8	Install an estimated five borings in a period of three days to identify the approximate west boundary of Site G (minimum of two days).	5.1		

Change Order Number	Brief Description	Pertinent FSP Section	Deviation Submitted	Clarification Submitted
9	Access delay to Site I required remobilization of equipment operation and extension of rental equipment.	5.4		
10	Addition of 36 soil-gas survey points to bring total from 29 to 65 to support the required transects per the FSP	5.2		
11	Remove and/or abandon three slug test piezometers from the approximate depths of 80, 40, and 20 feet.	5.14		
12	Perform two slug tests IAW FSP Section 5.14 on leachate wells located at Sites G and I.	5.14	X	
13	Perform three additional days for test trenching at Sites N and G.	5.1		
14	Resample EEG-108 0.5 foot and 3 – 6 feet background soil samples due to holding times exceeded caused by weather in Savannah, GA.	5.19		
15	Camera purchase for documenting labels/package information and O'Brien & Gere hours	5.5		
16*	Provide dump truck support for emergency service, as necessary.	5.5		
17*	Perform two additional days for test trenching at Site I.	5.1		
18*	Perform ground-penetrating radar survey of potential targets identified in the magnetic geophysical survey performed previously at Site I.	5.5		
19	Construct casings to prevent introduction of mud/slurry from the mud rotary and grouting process into the inner casing.	5.8 and 5.10		
20	Remove mud slurry from four-inch casing constructed/installed at Site I.	5.8		
21	Survey cross-section and specific points for ecological sediment sampling.	5.20.5		
22	Perform test trenching at Site I in accordance with FSP Sections 5.1 and 5.5 on Saturday and Sunday. Test trench completions may vary from one to five.	5.1 and 5.5		
23	Addition of three ground water samples to bring total from 8 to 11	5.8		
24	Provide access to construct bedrock well at Site G.	5.10		
25*	Change task for sediment thermal desorption, from every 200 feet in Segment B to two samples in Segment B and from 10 samples to 2 at Site M. Also prepare samples for analysis and ship to Savannah Laboratory on ice, preparing sample for pilot test.	5.23		
26	Redrill and reconstruct four-inch casing through eight feet of bedrock to a deeper bedrock formation. Also requires removal of constructed four-inch casing and associated cement grout.	5.10		
27	Collect five-gallon buckets of soil/sediment every 200 feet in Creek Segment B.	5.23		

Change Order Number	Brief Description	Pertinent FSP Section	Deviation Submitted	Clarification Submitted
28	Collect ground water samples from two leachate wells and ship to laboratory.	5.23		
29	Install 18-inch steel casing to 25 feet. Needed to perform mud rotary drilling activities at Site G.	5.10		
30	Extend eight-inch casing at Site G 25 feet.	5.10		

* - Not implemented.

Table 2 *Deviations – Solutia – Sauget Area 1*

Date	Brief Description	Pertinent FSP Section	Change Order Submitted
01-Nov-99	Startup procedures for SGS	5.2	
12-Oct-99	Additional boring due to lack of recovery at Site G	5.3	
27-Sep-99	Layout of boring locations	5.3	
30-Sep-99	Encore every 2' vs 10' of waste	5.3	
05-Oct-99	Use 4-ounce jars for VOC vs. Encore	5.3	
07-Oct-99	Additional boring in center at each site	5.3	X
13-Dec-99	GSA during slug test piezometer installation	5.15	
10-Jan-00	Sediment sampling method	5.20.1	
03-Apr-00	Do not conduct on-site sediment thermal and sediment stabilization	5.23	
04-Apr-00	100% surface soil samples for dioxin during DAS	5.18.3	
10-Apr-00	Introduce water into shallow wells for slug test	5.14.3	
07-Apr-00	Perform slug test on leachate wells	5.14	X
25-Apr-00	Change ID labels for BR samples	6.1.1	
26-Aug-99	Change to air sampling procedure	5.22	
31-Aug-99	Characterization on air sampling QA/QC	5.22	

Table 3 *Clarifications – Solutia – Sauget Area 1*

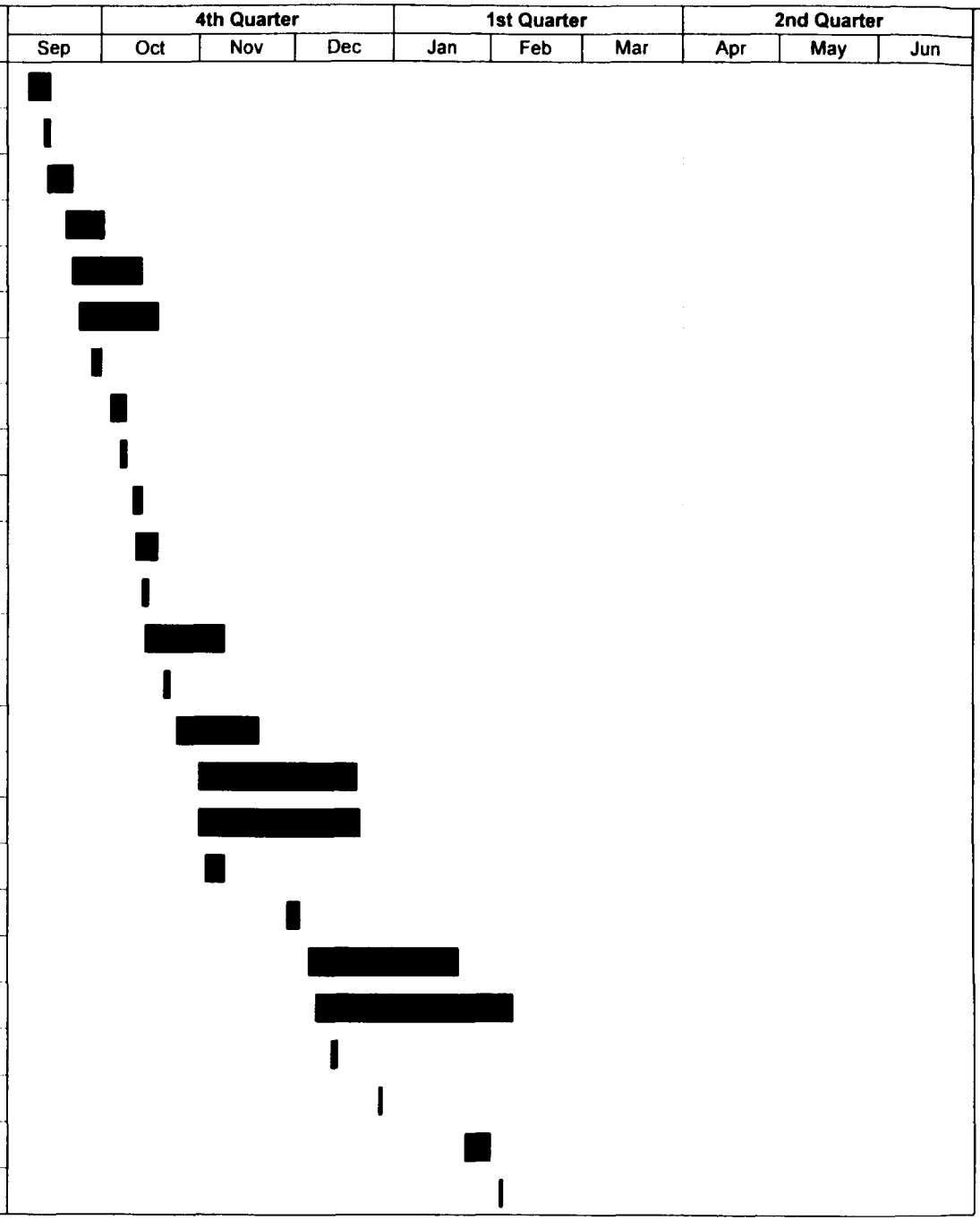
Date	Brief Description	Pertinent FSP Section	Change Order Submitted
10-Nov-99	VOC sample locations	5.17.2 vs. 5.17.5	
24-Jan-00	Use of nitrogen gas to open screen	5.16	X
09-Dec-99	Construction procedures	5.3.3	
23-Mar-00	Specifying sampling interval/depth	5.12	

1.3. Project Schedule

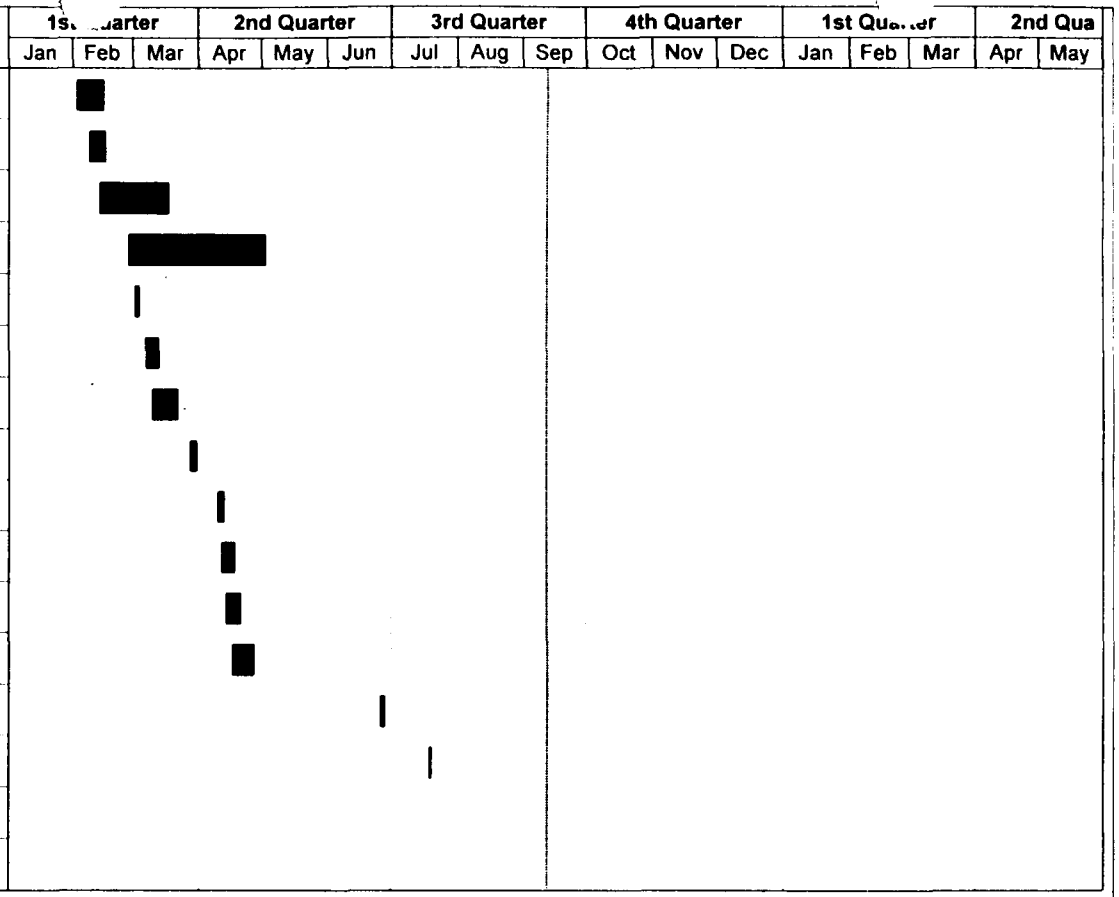
The actual completion schedule of the FSP tasks is provided on the next page:

ID	Task Name	Duration	Start	Finish
1	Air Sampling	5d	9/8/99	9/14/99
2	Aerial Photo Analysis	2d	9/13/99	9/14/99
3	Test Trenches - Boundary (Sites G, H, I, L)	6d	9/14/99	9/21/99
4	Elevation Monitoring Piezometers	10d	9/20/99	10/1/99
5	Fill Area Ground Water Sampling	16d	9/22/99	10/13/99
6	Waste Sampling (Sites G, H, I, L, M)	17d	9/24/99	10/18/99
7	3Q99 Elevation Monitoring	3d	9/28/99	9/30/99
8	Surface Water Sampling	5d	10/4/99	10/8/99
9	Creek Sediment Sampling (Ecological & BPL)	2d	10/7/99	10/8/99
10	Grain Size Analysis (Sites G,H, I, L)	3d	10/11/99	10/13/99
11	Upgradient Groundwater Sampling	5d	10/12/99	10/18/99
12	Residential Ground Water Sampling	2d	10/14/99	10/15/99
13	Magnetometer Survey	17d	10/15/99	11/8/99
14	Domestic Well Sampling	2d	10/21/99	10/22/99
15	Undeveloped Soil Sampling	20d	10/25/99	11/19/99
16	Soil Gas Survey	36d	11/1/99	12/20/99
17	Downgradient Alluvial Aquifer	37d	11/1/99	12/21/99
18	Fill Area Sampling - Damaged Wells	4d	11/3/99	11/8/99
19	Waste Sampling (Site N)	4d	11/29/99	12/2/99
20	Slug Test Piezometer Installation	35d	12/6/99	1/21/00
21	Sediment Sampling	44d	12/8/99	2/7/00
22	Grain Size Anlaysis (Site N)	2d	12/13/99	12/14/99
23	4Q99 Elevation Monitoring	1d	12/28/99	12/28/99
24	Upgradient Groundwater Sampling (Nitrogen Gas) and Background Soil Sampling	6d	1/24/00	1/31/00
25	Surface Water Sampling (Prairie DuPont)	1d	2/4/00	2/4/00
26	Test Trenches - Boundary (Site N and G)	9d	2/3/00	2/15/00
27	Test Trenches - Interior (sites G, H, L, N)	6d	2/9/00	2/16/00
28	Alluvial Aquifer Sampling	26d	2/14/00	3/17/00
29	Bedrock Sampling	48d	2/28/00	5/2/00
30	1Q00 Elevation Monitoring	2d	3/2/00	3/3/00
31	Site I Trenching	5d	3/7/00	3/12/00
32	W. Boundary of Site G	9d	3/10/00	3/21/00
33	Time Series	3d	3/28/00	3/30/00
34	Slug Testing	3d	4/10/00	4/12/00
35	Pilot Test - Waste	4d	4/12/00	4/17/00
36	Developed Area Soil Samples	5d	4/14/00	4/20/00
37	Pilot Test - Leachate	8d	4/17/00	4/26/00
38	2Q00 Elevation Monitoring	2d	6/26/00	6/27/00
39	Pilot Test - Leachate 2	1d	7/19/00	7/19/00

ID	Task Name
1	Air Sampling
2	Aerial Photo Analysis
3	Test Trenches - Boundary (Sites G, H, I, L)
4	Elevation Monitoring Piezometers
5	Fill Area Ground Water Sampling
6	Waste Sampling (Sites G, H, I, L, M)
7	3Q99 Elevation Monitoring
8	Surface Water Sampling
9	Creek Sediment Sampling (Ecological & BPL)
10	Grain Size Analysis (Sites G,H, I, L)
11	Upgradient Groundwater Sampling
12	Residential Ground Water Sampling
13	Magnetometer Survey
14	Domestic Well Sampling
15	Undeveloped Soil Sampling
16	Soil Gas Survey
17	Downgradient Alluvial Aquifer
18	Fill Area Sampling - Damaged Wells
19	Waste Sampling (Site N)
20	Slug Test Piezometer Installation
21	Sediment Sampling
22	Grain Size Anlaysis (Site N)
23	4Q99 Elevation Monitoring
24	Upgradient Groundwater Sampling (Nitrogen Gas) and Background Soil Samplin
25	Surface Water Sampling (Prairie DuPont)



ID	Task Name
26	Test Trenches - Boundary (Site N and G)
27	Test Trenches - Interior (sites G, H, L, N)
28	Alluvial Aquifer Sampling
29	Bedrock Sampling
30	1Q00 Elevation Monitoring
31	Site I Trenching
32	W. Boundary of Site G
33	Time Series
34	Slug Testing
35	Pilot Test - Waste
36	Developed Area Soil Samples
37	Pilot Test - Leachate
38	2Q00 Elevation Monitoring
39	Pilot Test - Leachate 2
40	
41	



Section 2

2. Nonmeasurement Data Acquisition

2.1. Topographic Map and Sample Location Surveying

2.1.1. Topographic map

Surdex, an aerial photography and mapping subcontractor, flew the study area in late March to obtain current aerial photographs of the study area prior to the spring emergence of vegetation. These photographs, combined with ground control surveying, were used to prepare a topographic map of the study area with a 1" = 50' scale and a topographic contour interval of one foot. This map consists of seventeen 30-inch by 40-inch sheets and meets National Map Standards with a horizontal accuracy of +/-1.25 feet and a vertical accuracy for contour lines of +/-0.5 foot.

2.1.2. Location and Elevation Surveying

Information submitted to USEPA Region V and IEPA describing sampling locations was identified in the field using a global positioning satellite (GPS) system capable of producing decimal latitude and longitude readings having a horizontal accuracy of one meter or less. Well elevations were surveyed to an accuracy of 0.01 foot. Information submitted to USEPA Region V and IEPA must be in a Microsoft Excel®-compatible electronic spreadsheet and must include columns on:

- Latitude (decimal degrees)
- Longitude (decimal degrees)
- sample identification
- sample description (e.g., soil, ground water)
- locational method
- sample depth
- time and date of sample collection
- time and date of sample analysis

- chemical parameter
- chemical result
- analysis method
- detection limit
- chemical units (parts per million [ppm], parts per billion [ppb], milligrams per kilogram [mg/kg], etc.)
- result qualifier (nondetect, etc.).

2.2. Aerial Photograph Acquisition and Analysis

Available historical air photographs not included in the 1988 Ecology and Environment Report were obtained for Sites G, H, I, L, and N. These photographs and the results of the ecology and environment evaluation were used to define the areal extent of each site. Estimated boundaries of the waste disposal areas were defined using historical aerial photographs to establish the areal extent of excavation and fill areas over time. For each photo, the boundaries of Sites G, H, I, L, and N were traced and inputted into an AutoCAD file. To define the extent of fill, the AutoCAD files were overlain for each site, and a line was drawn around the outside boundary of the composite fill areas. Stereoscopic evaluation of historical aerial photographs did not allow identification of the deepest portion of the fill area; hence, one of the four waste characterization borings could not be located based on fill area depth.

Results of the analysis of historical aerial photographs were used to prepare a map for each site showing estimated fill area boundaries and the final selected locations of the boundary confirmation trenches and the waste characterization borings. When the map for each fill area was completed, it was submitted to USEPA Region V for acceptance prior to performance of the boundary confirmation trenching or collection of the waste characterization samples.

Boundary confirmation trenches and waste characterization borings were located in the field by measuring from known points, such as buildings, roads, or other cultural features or by using GPS.

Section 3

Section 3.1

3. Field Activities by Task

3.1. Source Area Boundaries Delineation – Test Trenches

3.1.1. Rationale/Design

Test trenches were used to confirm the boundaries of the fill areas identified through aerial photograph analysis. One trench was planned on each side of a fill area, a total of four trenches per site. Due to field observations, input from USEPA Region V, and access limitations, the number of boundary test trenches varied per site. Borings were performed rather than trenching for additional boundary investigations west of Site G due to physical limitations (Section 3.1.3.1). Site I test trenching was limited to two trenches for the north and the east, due to general knowledge of the fill extent to the south and west, and the limited time frame to complete test trenches. In general, trenches were located at the approximate midpoint of the four longest sides of the defined boundary. A GPS system was used to document the locations on aerial site maps. Test trenches typically started outside the defined boundary of the fill area and moved toward the defined boundary. When fill materials were encountered, the fill area boundary was considered confirmed, and trenching at that location was terminated. In some cases, the trench started inside the fill boundary and moved toward the presumed area of native materials. In these cases, the fill boundary was confirmed when native materials were encountered. Boring were started outside the presumed fill area boundary and strategically moved along a line until waste presence was identified within 10 feet of waste absence. The presence or absence of waste was identified by inspection of drill cuttings on solid flight augers after removal from the borings. Excavated soil and fill material were returned to the test trenches or borings, with the exception of one intact drum removed from a trench on the west side of Site G. This drum was removed, overpacked, and staged at the Judith Lane storage location prior to disposal. Trenches were not entered to recover drums because of the danger inherent in such activities. Test trench locations were identified using GPS and recorded for future reference in the event drum removal is appropriate. No free product or contaminated soil was generated during removal of this one drum. Waste that identified the source of material present in the fill area was not observed during this activity.

Number of test trenches	22
Number of test borings	8

Site	Boundary	Trench	Boring
G	West	1	
G	West	1A	
G	West		1
G	West		2
G	West		3
G	West		4
G	West		5
G	West		6
G	West		7
G	West		8
G	North	2	
G	South	3	
G	South	3A	
G	South	3B	
G	East	4	
H	North	1	
H	West	2	
H	South	3	
H	East	4	
I	North	1	
I	East	2	
L	East	1	
L	East	1A	
L	West	2	
L	South	3	
L	North	4	
N	North	1	
N	West	2	
N	South	3	
N	East	4	
TOTAL		22	8

Trenching locations were selected in the field with the concurrence of USEPA Region V or its designee. Trench locations and test borings are depicted on Figures 11 through 16. Trenching equipment was hired on a per-day basis.

3.1.2. Field Procedures

Prior to performing field work, a Preparatory Inspection Meeting attended by a representative of each of the interested parties was held (Section 3.1.3.2). Selecting of trench locations was based on the fill area boundaries identified through aerial photograph analysis and the presence of limiting site features. Selection of test trench locations was performed with the concurrence of USEPA Region V or its designee and noted in the field notebook. The O'Brien & Gere Field Leader observed the trenching activities and was authorized to take corrective measures to respond to unsanitary, hazardous, or dangerous conditions to workers. A track-mounted hoe with an extended arm was initially used to provide the capability to excavate to a maximum depth of 40 feet below grade. After confirmation that ground water infiltration and poor soil stability would limit the trench depths to 20 feet or less, a track-mounted hoe with a 20-foot dig depth was used. All trenching activities were conducted in a manner that protected existing utilities, structures, surface features, monitoring wells, and the general site environment. Additionally, trenching activities were conducted in a manner that protected workers from hazards associated with excavations. A photoionization detector (PID), a four-gas meter (oxygen, carbon monoxide, hydrogen sulfide, and lower explosive limit), and a real-time aerosol monitor (RAM) were used to monitor the test trenches for hazardous conditions. The hoe operator was equipped with a separate supplied-air system.

Test trenches were planned to be advanced to a maximum depth of 40 feet, where possible. Ground water infiltration and/or poor soil stability resulted in the inability to complete any of the test trenches to 40 feet. No accommodations were made to dewater test trenches or manage ground water during excavation activities; this minimized the generation of investigation-derived wastes.

Trenching activities proceeded away from native soils or fill until the opposite material was encountered. Where native soils were encountered, vertical excavation proceeded until fill was encountered or until a limiting depth was reached (e.g., due to ground water infiltration or soil instability). The limiting depth was maintained as the excavation was advanced in the direction of the fill boundary. The location where the waste/native interface was encountered, within the test trench, was designated as the site boundary for that location. As the trenching proceeded, spoils from the test trench were placed on polyethylene plastic sheeting having a minimum thickness of six mil. Provisions were made to allow free liquids in the spoils to drain back to the trench. Spoils from each test trench were segregated and returned to the excavation in reverse order of removal. Prior to handling the cover material, the excavator bucket was grossly decontaminated using a shovel and/or a potable water source. This decontamination debris was placed into the excavation trench prior to placement of cover material. Backfilling was conducted in a manner to minimize ponding of water over the trench. Silt fence was used as necessary to minimize runoff of surface soils during rain events. A test trench at one location was backfilled prior to initiation of a test trench at another location. After

completion of site investigation activities, disturbed surfaces were restored with materials matching adjacent surfaces to existing grades.

3.1.3. Documentation

The change order for performing borings in place of test trench is included in Section 3.1.3.1. Field logs generated are included in Record Book Nos. 2, 3, and 5 (Appendix D). Figures 11 through 15 depict test trench locations. Digital photographs of each test trench completed are included in Section 3.1.3.3.

Documentation for this task continues on the next page.

3.1.3.1. *Change Orders and Deviation/Clarification Log*

(10 BG

PROJECT CHANGE ORDER

O'BRIEN & GERE ENGINEERS, INC.
PROJECT NAME: Solutia - Sayget Area 1 - Boring for W. Burning at Site 6

PCO NUMBER _____ DESCRIPTION Install an estimated 5 borings in a period of 2 days to identify the approximate west boundary of site 6. (minimum of 2 days)

SUBMITTED TO	Kimberly Perry	COMPANY	Solutia
SUBMITTED BY	Tim Tedesco	COMPANY	OBG
INITIAL DATE	16 Dec 99	REQUIRED DATE	7 Jan 00
DAYS REQUESTED	2	AMOUNT REQUESTED	[redacted]

CHANGE ORDER ITEMIZED DESCRIPTION

- Need to use drilling/probing method to approximate the W. Boundary at site 6
- Requires review of aerial photos, meeting estimated boundary boring locations, prep. inspection meeting, utility clearance of contractor/driller coordination & level C protection
- Mobilize equipt. capable of both drilling & probing → Low Profile Equipt.
- Borings are assumed to be limited to 5, to depth of 15' & completed within 2 days
- Boring activities require DCON pre construction, decontamination activities, managing Investigative Derived Waste, level C health & safety equipt., grouting & filling of boreholes

Activities require rental monitoring equipt., 55 gallon drums & survey work

- 1st day → Project Mark Ams
  2nd & 3rd Day → Drill/Probe
- Total Cost - [redacted]
- Total Time - 3 days (minimum of 2 days)
- Cost per day = [redacted] (minimum of 2 days up to 3 days)
- Cost per additional day = [redacted] (applied to days exceeding 5 days)

Reason for Boring/Drilling vice Trenching:
Trenching is not feasible due to confined work area.

Tim Tedesco / Tim T. / 15 Dec 99
PRINTED NAME / SIGNATURE OF PREPARER / DATE

IF ADDITIONAL SPACE IS REQUIRED, RECORD ON REVERSE SIDE

BRUCE YORE Bruce S. Yore 1/30/00
PRINTED NAME / SIGNATURE OF SOLUTIA REP / DATE

L:\OUIS\DIVISION\ADMIN\1999\PCOREQUST.WPD

Method to Further Identify the Approximate Western Boundary of Site G
Sect. 5.1 of the FSP (As Applicable)
9 Dec 99

Step 1

Review aerial photos and available data to estimate west boundaries
Mark estimated west boundary to the south of the Wiese building and between the trailers to the West
Mark the first three potential drill locations to the south of the Wiese building and between the trailers to the West:

- 1st – within 5 FT. of the southwest corner of the Wiese building
- 2nd – half distance between the 1st marking and Route 3 to the west of the Wiese building
- 3rd – half distance between the 1st marking and the western fence line of site G

Clear the area for utilities
Wiese coordination and logistics

Step 2

Mobilize rig capable of probing and/or drilling
Construct DCON pad*
Prepare Level C equipment
Drill/probe at the 1st marked location – Sect. 5.1 will be followed in general**
- waste presence/absence confirmed through drill cuttings or stainless steel probe sampler
  -- waste presence will be documented in boring log and photographed (Sect. 5.1)

- waste presence confirmed ***
  -- mobilize to the next location to the west (2nd marked potential location stated above)
    A) waste presence confirmed -- mobilize to the next location to the West which will be half the distance between the present location and Route 3 to the west of the Wiese building (continue west mobilizing ≥10 FT. until Route 3)

- waste absence confirmed – drill to top of water table (estimated at 15 FT.)
  -- mobilize to the next location to the east (3rd marked potential location stated above)
    B) waste absence confirmed – drill to top of water table (estimated at 15 FT.)
    - mobilize to the next location to the East which will be half the distance between the present location and western fence line of site G (continue east mobilizing ≥ 10 FT. until the western fence line of site G)
    --- waste presence confirmed – GO TO "A" ABOVE

Drill/probe until the distance between a waste absence and waste presence confirmation boring is ≤ 10 FT.

Step 3

Survey the appropriate drilled/probed locations

*DCON operations and Investigative Derived Waste management will proceed as specified in the FSP (Sect. 5.1 and 9 as applicable)
** Each boring will be documented as specified in the FSP (Sect. 5.1 as applicable)
***Each boring will be filled as specified in the FSP (Sect. 5.1 as applicable)

3.1.3.2. *Preparatory Inspection Meeting Form*

MEETING MINUTES

September 14, 1999

Subject: Trenching Inspection Meeting

Attendees: Tim Gouger- United States Army Core of Engineers
Kimberly Perry- Solutia
John Fiore- Maverick
Alan Cork- O'Brien & Gere
David Haverdink- O'Brien & Gere
Joseph Perry- O'Brien & Gere
Dan Hans- Heritage Environmental Services
Lenny Perrone- Heritage Environmental Services
Michael Ondrachek- Roy F. Weston

08:35- Tim Gouger (USACE) in meeting via speakerphone

- Discussion of test trenching
- Use of aerial photos to review boundaries and propose test trench locations

SITE I: Cerro Copper- To date has not and will not (yet) allow access to site.

DEPTH OF TRENCHING: Originally, down to 40 feet- modified to 15 feet, or until groundwater is encountered.

BACKFILLING OF EXCAVATION: Soil to be back filled in reverse order of removal.

H & S: Action Level- 49.9 ppm(PID)

- RAM, CGI, and PID reading to be taken every five minutes
- Tim suggests taking PID readings during and after trenches are back filled.

Site L will be done first, sites G and H to follow.

A Komatsu PC-300 is scheduled to be used by Heritage.

09:15: Meeting adjourned.

CC: K. Perry 08 FEB00
E. Kemper @ 1830

PREPARATORY INSPECTION MEETING

Conducted by/Company: DE Haverdink / O'Brien + Gere **Date:** 08 FEB00
Project Name: Solutia - Sauget Area 1 **Task:** Boundary Test Trenching - Sites N & G

1. Scheduled Work:

2. Equipment, Procedures, Personnel:

3. Ref. To App. Sec. of FSP/HASP: FSP # 5.1 , HASP # 2.1

4. Issues that could arise and how to resolve:

5. Solutia comments:

6. EPA comments:

① Boundary test trenching - Sites N & G (S. boundary)

② Track hoe w/ 20' dig depth + 40" bucket ; levels B+C PPE on-hand ; monitoring instruments ; begin trenching in "native" area, segregate top ~12" from subsurface in different piles, max. depth is ground water or as limited by excessive trench caving, trench toward fill boundary to identify non-native materials record trench dimensions, ID of waste sources where possible, digital photos, monitoring readings ; back fill trench in reverse order, segregate plastic

③ See above

④ Fill in "native" area : trench away from known fill area to find native.
Excavator sinking / shifting : Workers stay clear of excavator while moving ; stay in eye contact w/ operator to approach trench + excavator
Fire, gas emission, explosion, drum rupture : workers to stay clear of trench edges, observe monitoring equip. readings, fire ext. on-hand for small fires

OVER →

ATTENDANCE:

EMPLOYEE NAME (print)	EMPLOYEE SIGNATURE	COMPANY
Nicke Jenkins	Nicke Jenkins	OBG
Ken Beverly	[illegible]	AMERICC
Kristen Perry	[illegible]	Solutia
[illegible]	[illegible]	OBG
Erik Kemper	[illegible]	REW
Tom Dulke	[illegible]	Heritage
Brent Kessinger	Brent Kessinger	"
Dan Hand	[illegible]	Heritage
Mike Reece	Mike Reece	OBG

IF ADDITONAL SPACE IS REQUIRED, RECORD ON REVERSE SIDE

DE Haverdink / DE Haverdink
PRINTED NAME/ SIGNATURE OF PREPARER

08FEB00
DATE

CHAD PRIETER [signature] OBG

(5) Solutia comments :

- record PID & other monitoring results as breathing zone or as "fill" as appropriate
- lines of communication : Heritage/OBG & OBG/Solutia
- use Cohoka PD as appropriate to notify authorities of fire, etc.

(6) EPA comments :

- Mike McAteer & Tim Gouger may be on-site

PREPARATORY INSPECTION MEETING

Conducted by/Company: DE Haverdink / ~~DE Haverdink~~ O'Brien + Gere Date: 20 Mar 00
Project Name: Solutia - Sauget Area 1 Task: W. boundary of Site 6 ID (supplemental)

1. Scheduled Work:	see below
2. Equipment, Procedures, Personnel:	" "
3. Ref. To App. Sec. of FSP/HASP:	FSP # 5.1 HASP # 2.4
4. Issues that could arise and how to resolve:	see below
5. Solutia comments:	" "
6. EPA comments:	" "

(1) Supplemental investigation of Site 6 W. boundary

(2) - Drill rig or ~~Power Probe~~ rig, solid stem augers, level C PPE;
- auger to ~ 15 fbg, inspect cuttings for fill or native material, document findings in field lg + take photos, place cuttings into: ① bore hole / ② drum; ~~one~~ start boring @ SW corner of Wiese bldg, split distance btwn Rt. 3 or Site 6 fence to narrow gap btwn native + fill, ID fill ~~edge of Rt~~ boundary within 10 ft.
- Harris - drilling ; OBG - documentation + inspection

(3) see above

(4) obstructions to planned boring locations - resolve by offsetting slightly

(5) drums to be staged near Wiese bldg on S. side

(6) none

ATTENDANCE:

EMPLOYEE NAME (print)	EMPLOYEE SIGNATURE	COMPANY
Jim Harris	Jim Harris	Harris Drilling
Kimberly Perry	Kimberly Perry	Sol. Inc
Brian Gimpel	Brian Gimpel	Cahokia Police Dept.
Ken Lafferty	Ken Lafferty	HAVEOCK
Jim Treacy	Jim Treacy	OBG
William E. Wright	William E. Wright	OBG

IF ADDITONAL SPACE IS REQUIRED, RECORD ON REVERSE SIDE

DE Haverdink / DE Haverdink
PRINTED NAME/ SIGNATURE OF PREPARER

20 Mar 00
DATE

cc: K. Perry 20 Mar 00
T. Geiger @ 1820

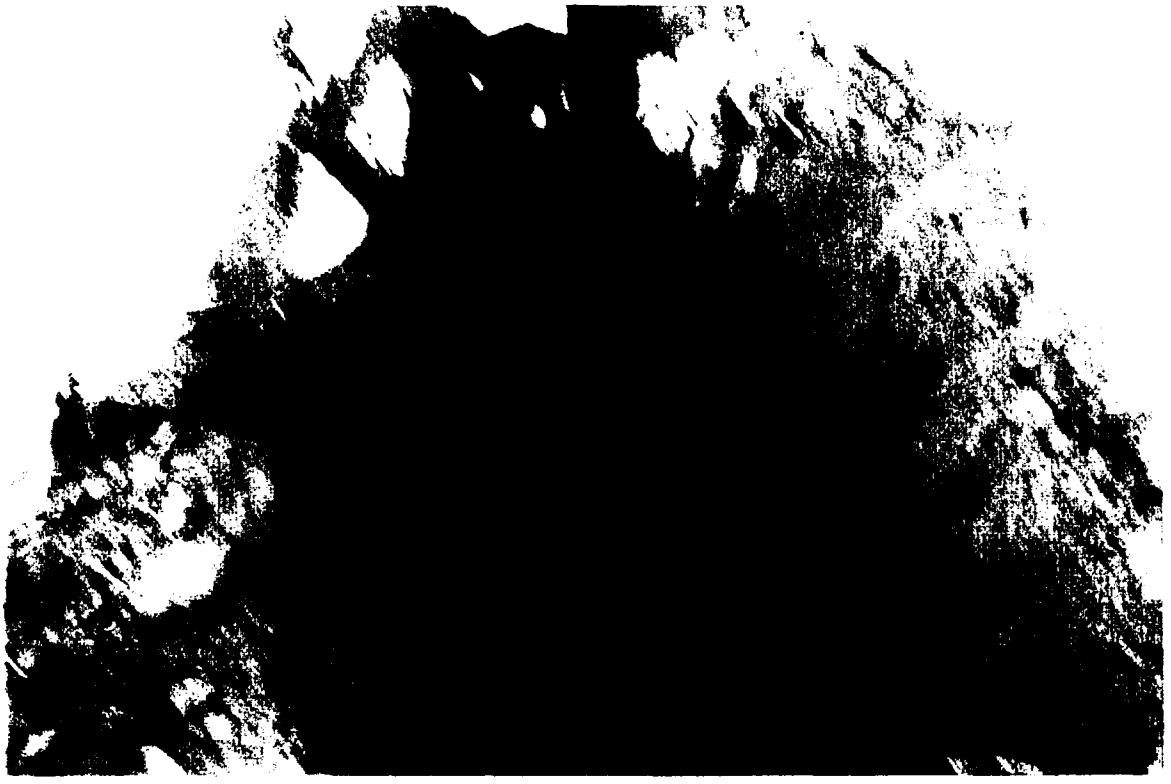
3.1.3.3. *Digital Photographs*

Site G boundary trenching, showing fill from west boundary trench; Sept 1999

Site G boundary trenching, showing west boundary trench area before excavation;
Sept 1999

Site G boundary trenching, showing native material excavated from west boundary trench; Sept 1999

Site G boundary trenching, showing native material excavated from west boudary trench; Sept 1999



Site G boundary trenching, showing blurry view of west boundary trench; Sept 1999

Site G boundary trenching, showing west boundary trench; Sept 1999

Site G boundary trenching, showing west view of west boundary trench; Sept 1999

Site G boundary trenching, showing fill from west boundary trench; Sept 1999

Site G boundary trenching, showing drum in bucket recovered from west boundary trench; Sept 1999

Site G boundary trenching, showing bottom of west boundary trench; Sept 1999

Site G boundary trenching, showing native and fill material excavated from second west boundary trench; Sept 1999

Site G boundary trenching, showing native and fill material excavated from second west boundary trench; Sept 1999

Site G boundary trenching, showing drums and fill excavated from second west boundary trench; Sept 1999

Site G boundary trenching, showing drum excavated second west boundary trench; Sept 1999

Site G boundary trenching, showing drums and fill excavated from second west boundary trench; Sept 1999

Site G boundary trenching, west view of second west boundary trench; Sept 1999

Site G boundary tenching, showing restored surface of second west boundary trench; Sept 1999

Site G boundary trenching, showing restored surface of second west boundary trench; Sept 1999

Site G boundary trenching, showing fill excavated from north boundary trench; Sept 1999

Site G boundary trenching, showing, fill excavated from north boundary trench; Sept 1999

Site G boundary trenching, showing fill excavated from north boundary trench; Sept 1999

Site G boundary trenching, showing, fill excavated from north boundary trench; Sept 1999

Site G boundary trenching, showing fill excavated from north boundary trench; Sept 1999

Site G boundary trenching, showing fill excavated from north boundary trench; Sept 1999

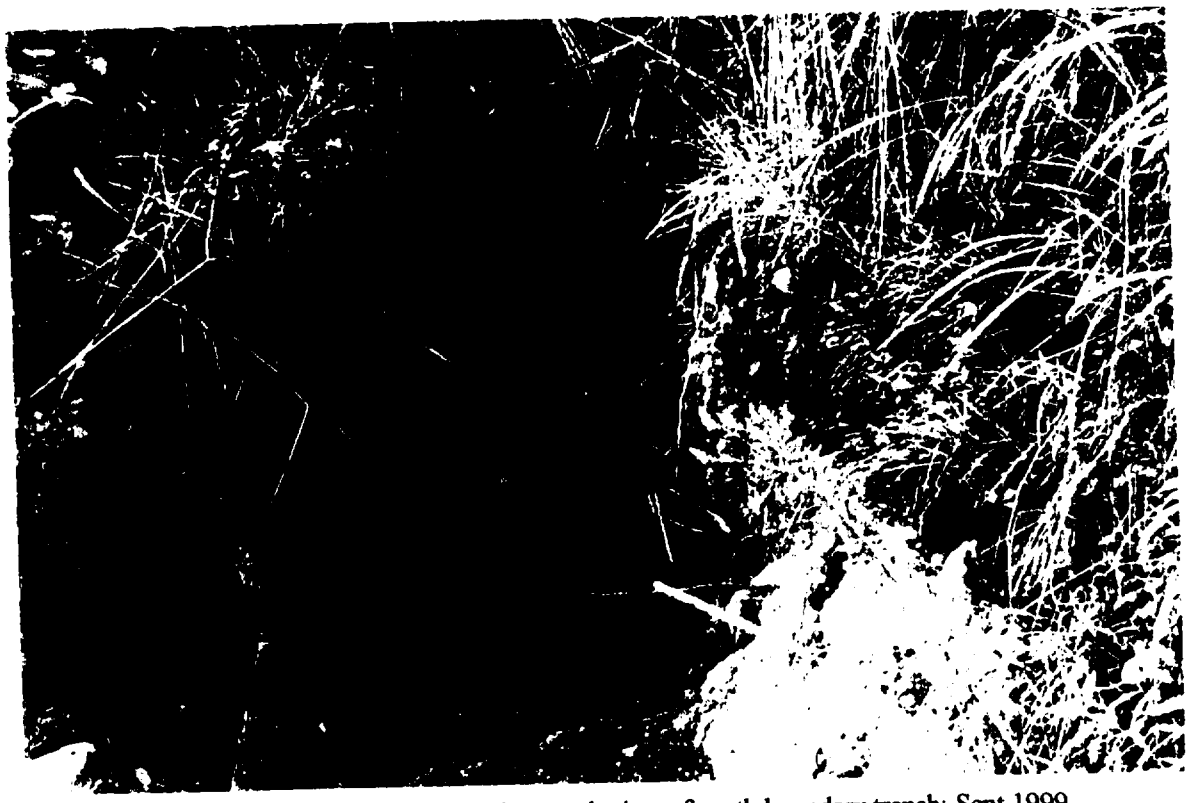
Site G boundary trenching, showing north view of north boundary trench; Sept 1999

Site G boundary trenching, showing south view of north boundary trench; Sept 1999

Site G boundary trenching, showing south view of south boundary trench; Sept 1999

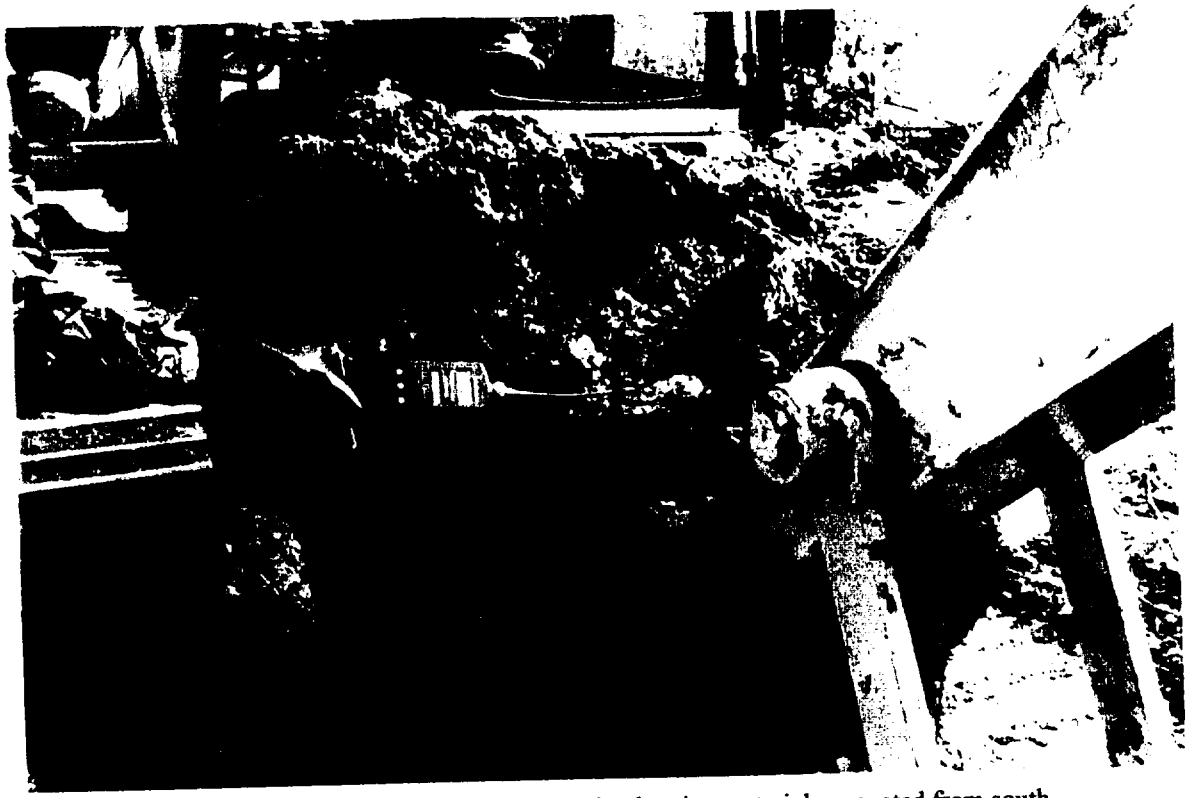
Site G boundary trenching, showing fill excavated from south boundary trench; Sept 1999

Site G boudary trenching, showing fill and stained native material excavated from south boundary trench; Sept 1999



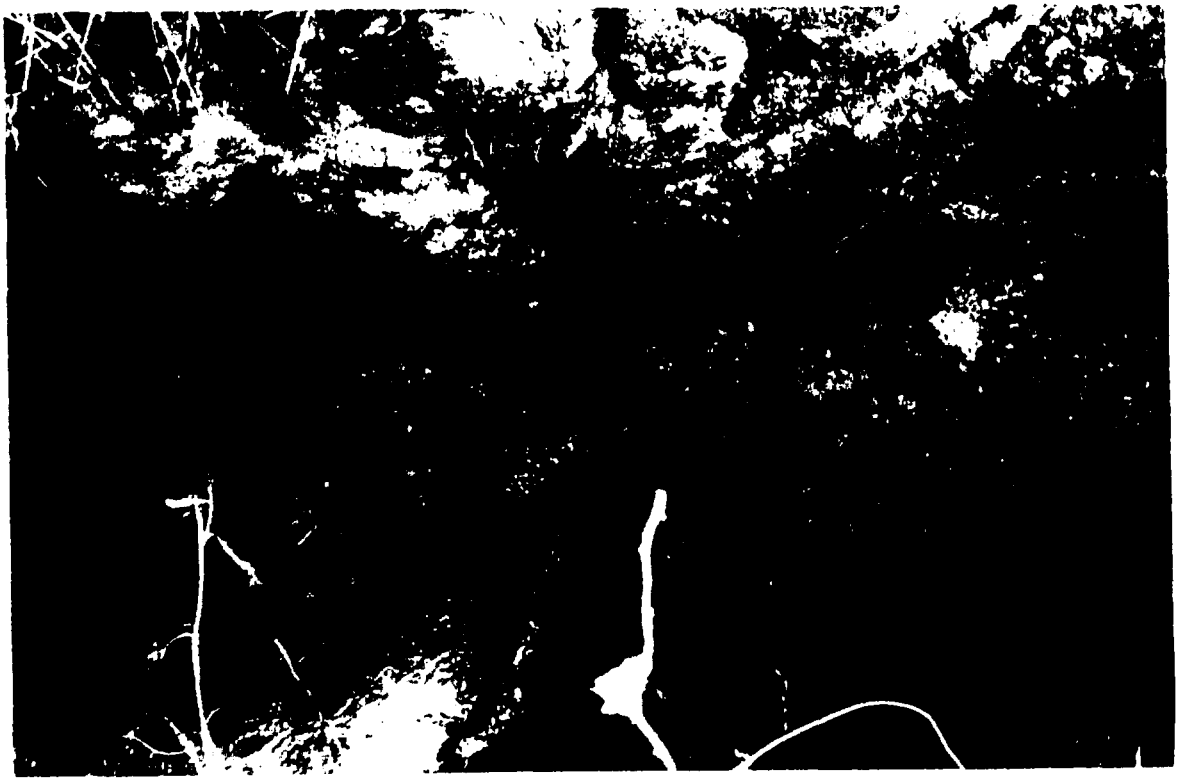
Site G boundary trenching, showing south view of south boundary trench; Sept 1999

Site G boundary trenching, showing fill and stained native material excavated from south boundary trench; Sept 1999



Site G boundary trenching, showing stained native material excavated from south boundary trench; Sept 1999

Site G boundary trenching, showing groundwater and stained native material in south boundary trench; Sept 1999



Site G boundary trenching, showing groundwater and stained native material in south boundary trench; Sept 1999

Site G boundary trenching, showing fill and stained native material excavated from east boundary trench; Sept 1999

Site G boundary trenching, showing stained native material in east boundary trench; Sept 1999

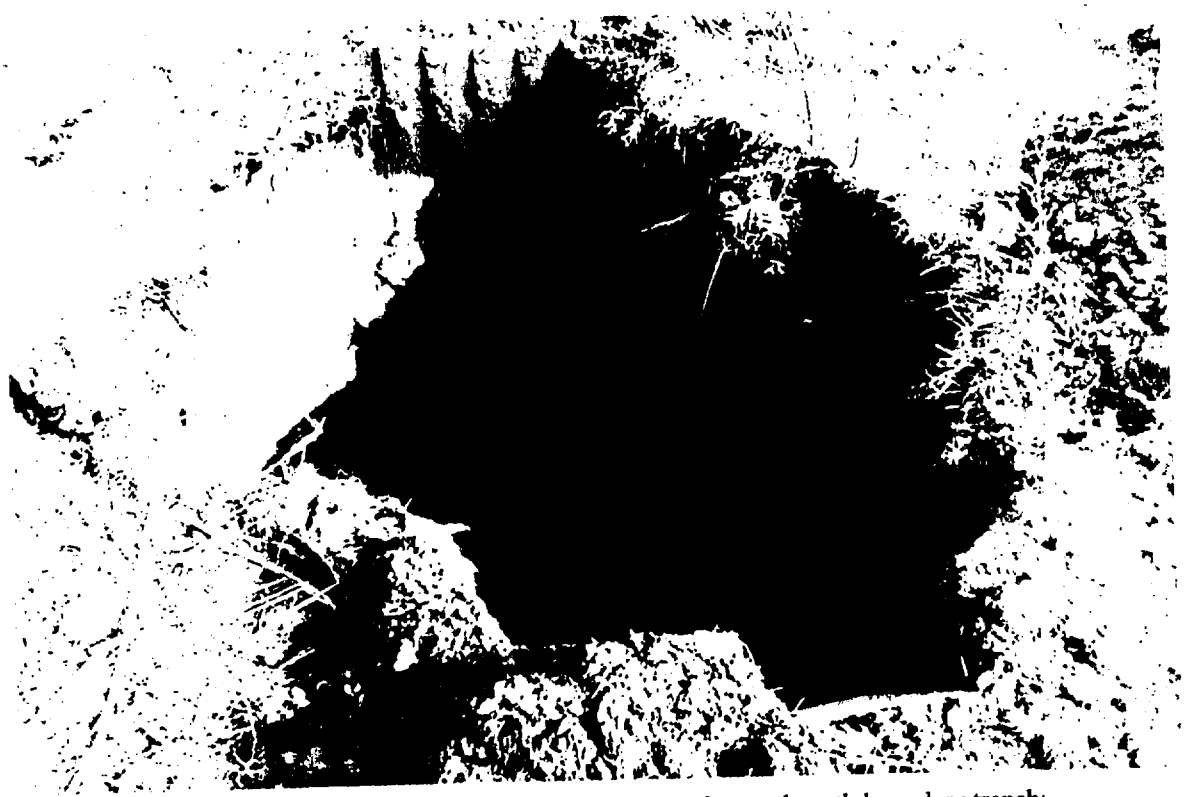
Site G boundary trenching, showing west view of east boundary trench; Sept 1999

Site G boundary trenching, showing fill excavated from east trench; Sept 1999

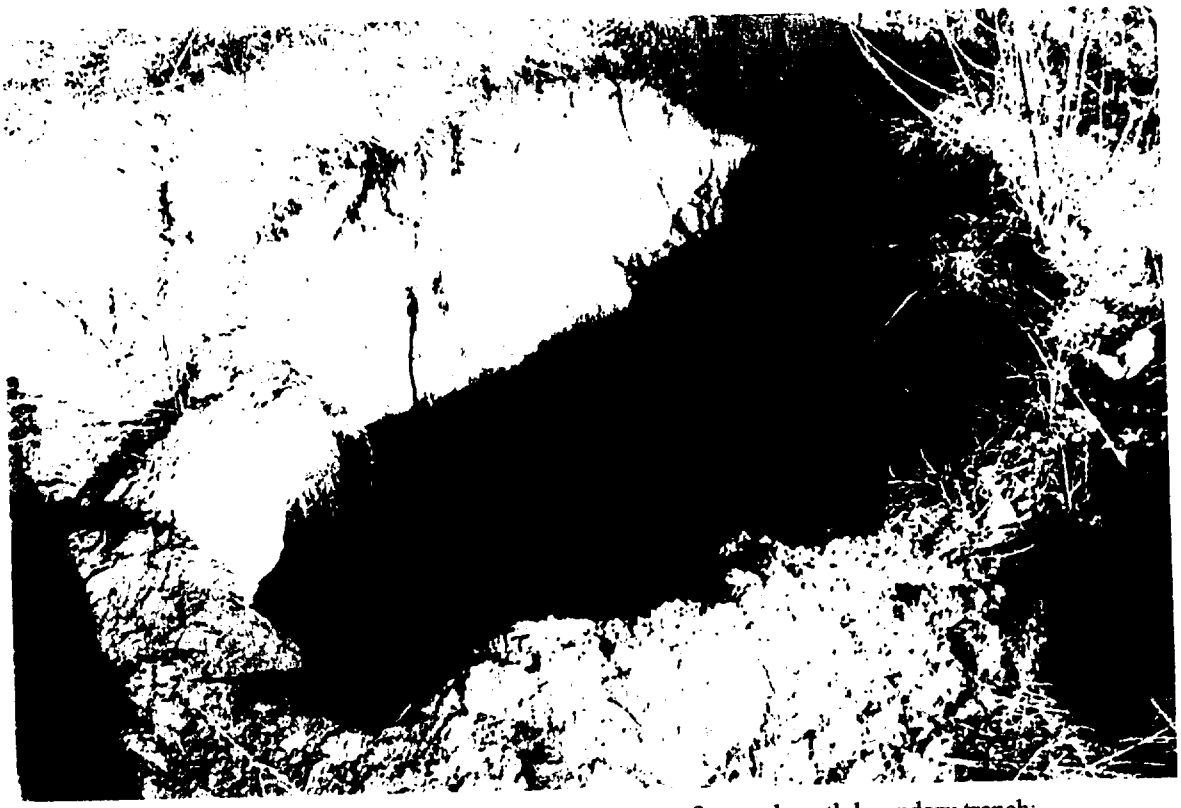
Site G boundary trenching, showing fill excavated from east boundary trench; Sept 1999

Site G boundary trenching, showing bucket with saturated sands taken from second south boundary trench; Feb 2000

Site G boundary trenching, showing ground water seeping from bucket over second south boundary trench; Feb 2000



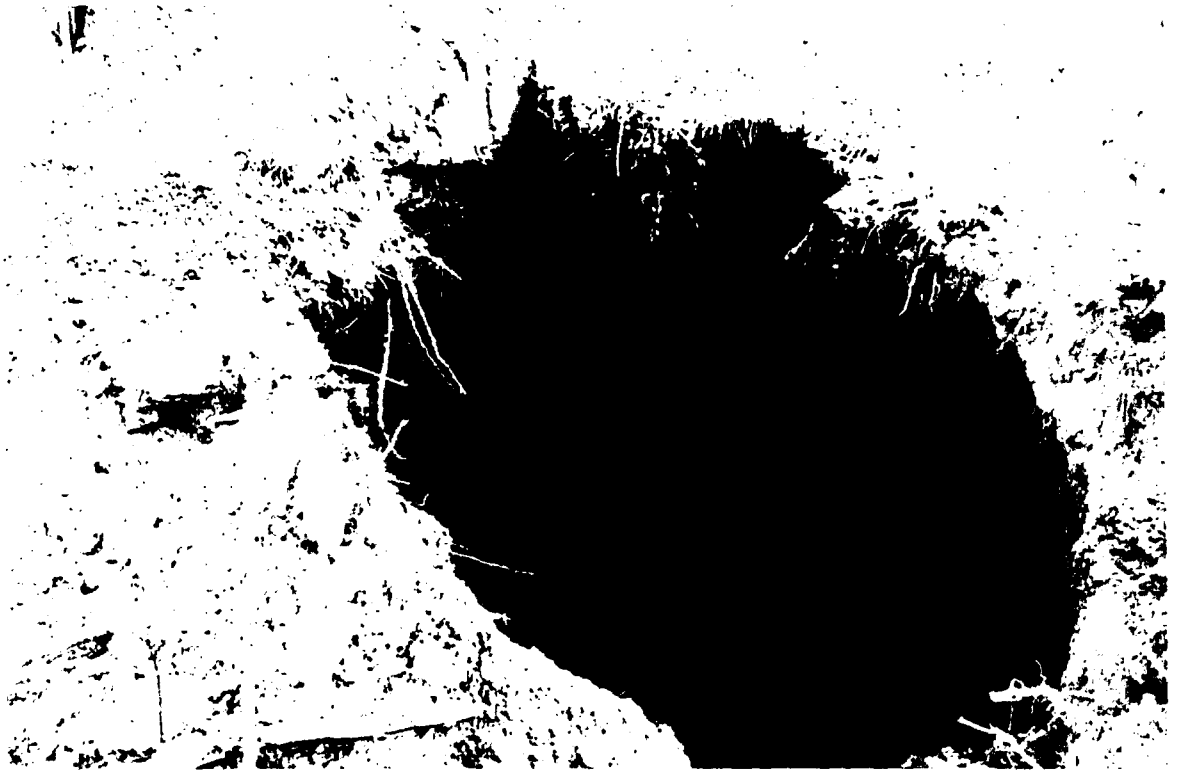
Site G boundary trenching, showing NW corner of second south boundary trench; Feb 2000



Site G boundary trenching, showing NE corner of second south boundary trench;
Feb 2000

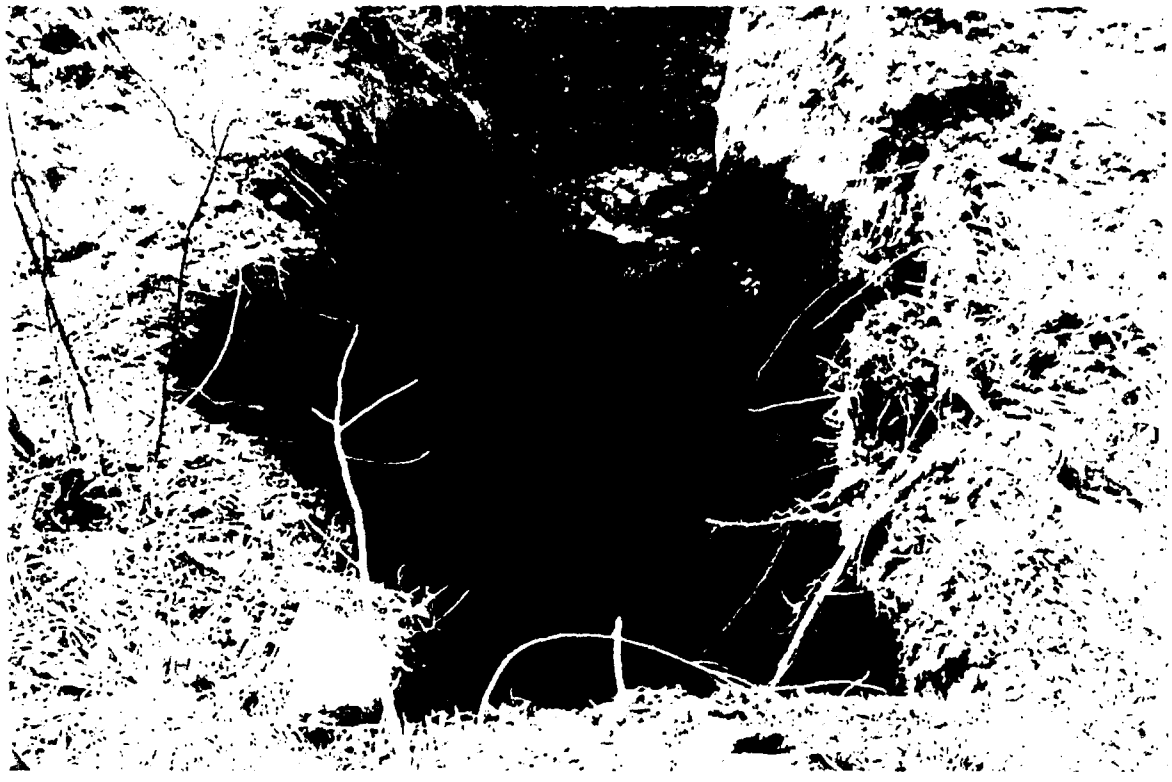
Site G boundary trenching , showing south end of second south boundary trench;
Feb 2000

Site G boundary trenching, showing north side and ground water depth of third south boundary trench; Feb 2000



Site G boundary trenching, showing NE side of fill layer in third south boundary trench; Feb 2000

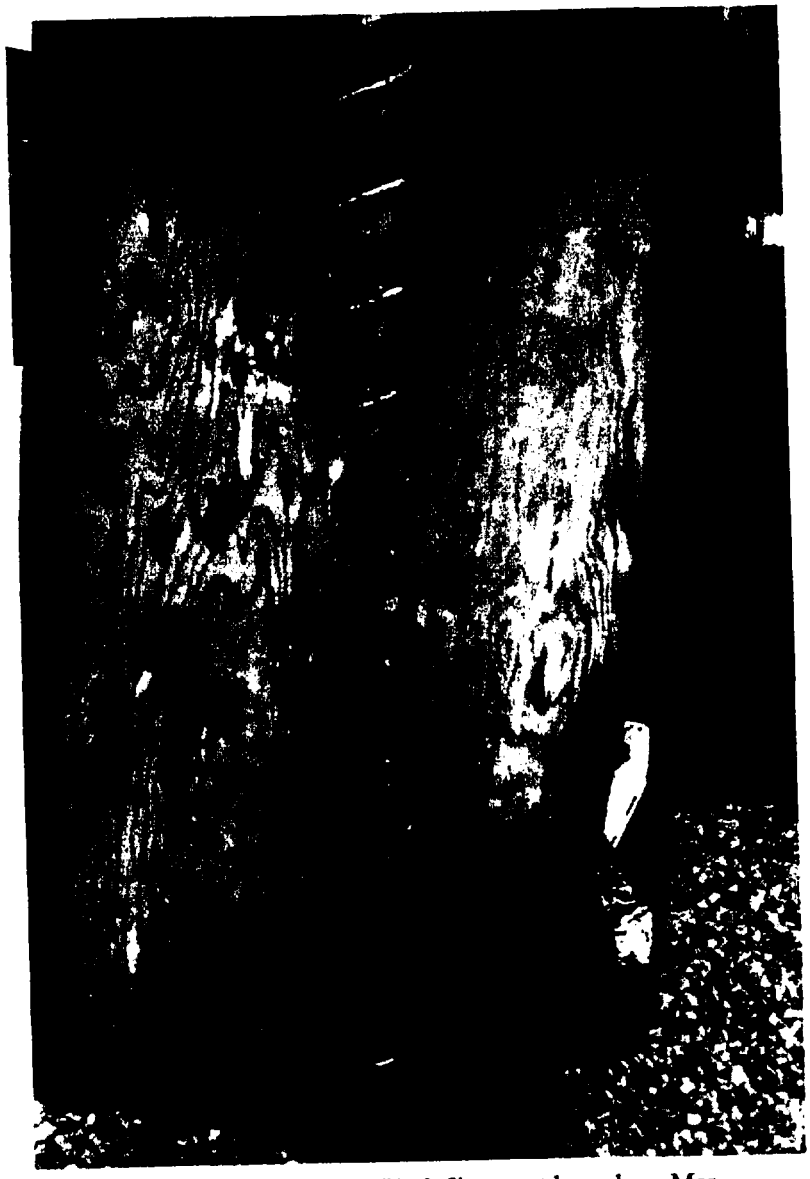
Site G boundary trenching, showing NE side of fill boundary in third south boundary trench; Feb 2000



Site G boundary trenching, showing south side of third south boundary trench; Feb 2000

Site G boundary trenching, showing NW corner of third south boundary trench ; Feb 2000

Site G boundary trenching, showing refuse pile with scrap metal from third south boundary trench; Feb 2000



Site G boundary auger #1, 0-5' at west boundary; Mar 2000

Site G boundary auger #1, 5-10' at west boundary; Mar 2000

Site G boundary auger #1, 10-15' at west boundary;
Mar 2000

Site G boundary auger #1, 10-15' at west boundary; Mar 2000

Site G boundary auger #2, 0-5' at west boundary; Mar 2000

Site G boundary auger #2, 5-10' at west boundary; Mar 2000

Site G boundary auger #2, 5-10' at west boundary; Mar 2000

Site G boundary auger #2, 10-15' at west boundary;
Mar 2000

Site G boundary auger #2, 10-15' at west boundary; Mar 2000

Site G boundary auger #2, 10-15' at west boundary; Mar 2000

Site G boundary auger #3, 0-5' at west boundary; Mar 2000

Site G boundary auger #3, 0-5' at west boundary; Mar 2000

Site G boundary auger #3, 5-10' at west boundary; Mar 2000

Site G boundary auger #3, 5-10' at west boundary; Mar 2000

Site G boundary auger #3, 10-15' at west boundary;
Mar 2000

Site G boundary auger #3, 10-15' at west boundary; Mar 2000

Site G boundary auger #4, 0-5' at west boundary; Mar 2000

Site G boundary auger #4, 0-5' at west boundary; Mar 2000

Site G boundary auger #4, 5-10' at west boundary; Mar 2000

Site G boundary auger #4, 5-10' at west boundary; Mar 2000

Site G boundary auger #4, 10-15' at west boundary;
Mar 2000

Site G boundary auger #4, 10-15' at west boundary; Mar 2000

Site G boundary auger #4, 10-15' at west boundary; Mar 2000

Site G boundary auger #5, 0-5' at west boundary; Mar 2000

Site G boundary auger #5, 5-10' at west boundary; Mar 2000

Site G boundary auger#5, 10-15' at west boundary; Mar 2000

Site G boundary auger #6, 0-5' at west boundary; Mar 2000

Site G boundary auger #6, 5-10' at west boundary; Mar 2000

Site G boundary auger #6, 5-10' at west bundary; Mar 2000

Site G boundary auger #6, 10-15' at west boundary;
Mar 2000

Site G boundary auger #6, 10-15' at west boundary; Mar 2000

Site G boundary auger #7, 0-5' at west boundary; Mar 2000

Site G boundary auger #7, 0-5' at west boundary; Mar 2000

Site G boundary auger #7, 5-10' at west boundary; Mar 2000

Site g boundary auger #7, 5-10' at west boundary; Mar 2000

Site G boundary auger #7, 5-10' at west boundary; Mar 2000

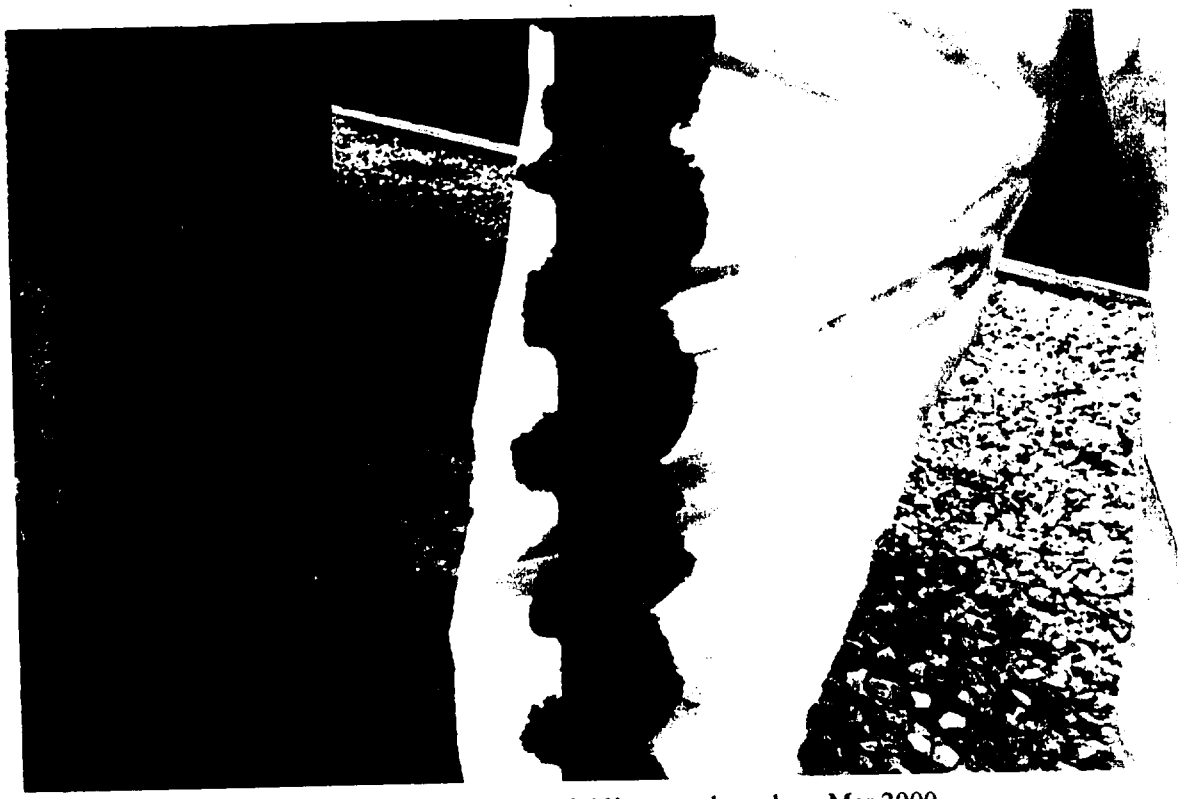
Site G boundary auger #7, 10-15' at west boundary;
Mar 2000

Site G boundary auger #7, 10-15' at west boundary; Mar 2000

Site G boundary auger #8, 0-5' at west boundary; Mar 2000

Site G boundary auger #8, 0-5' at west boundary; Mar 2000

Site G boundary auger #8, 5-10' at west boundary; Mar 2000



Site G boundary auger #8, 5-10' at west boundary; Mar 2000

Site G boundary auger #8, 10-15' at west boundary;
Mar 2000

Site G boundary auger #8, 10-15' at west boundary; Mar 2000

Site G boundary auger #8, 10-15' at west boundary; Mar 2000

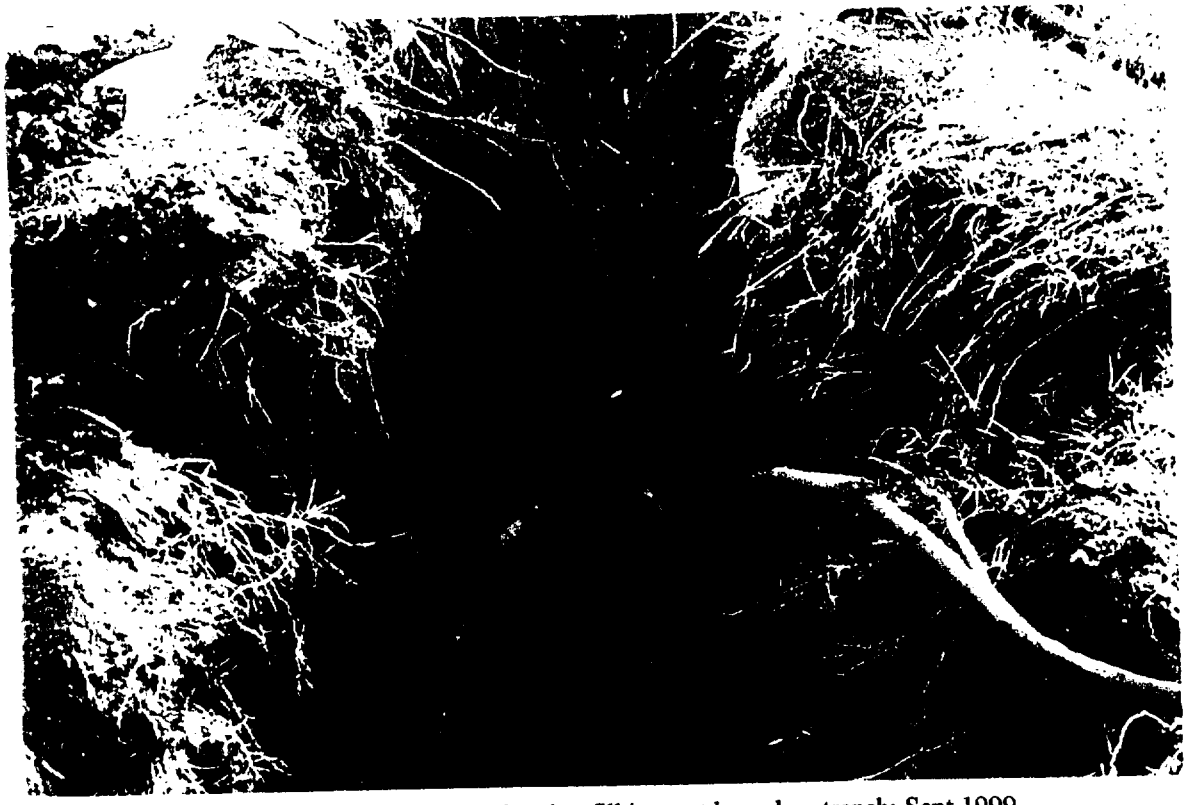
H

Site H boundary trenching, showing south view of north boundary trench; Sept 1999

Site H boundary trenching, showing north view of north boundary trench; Sept 1999

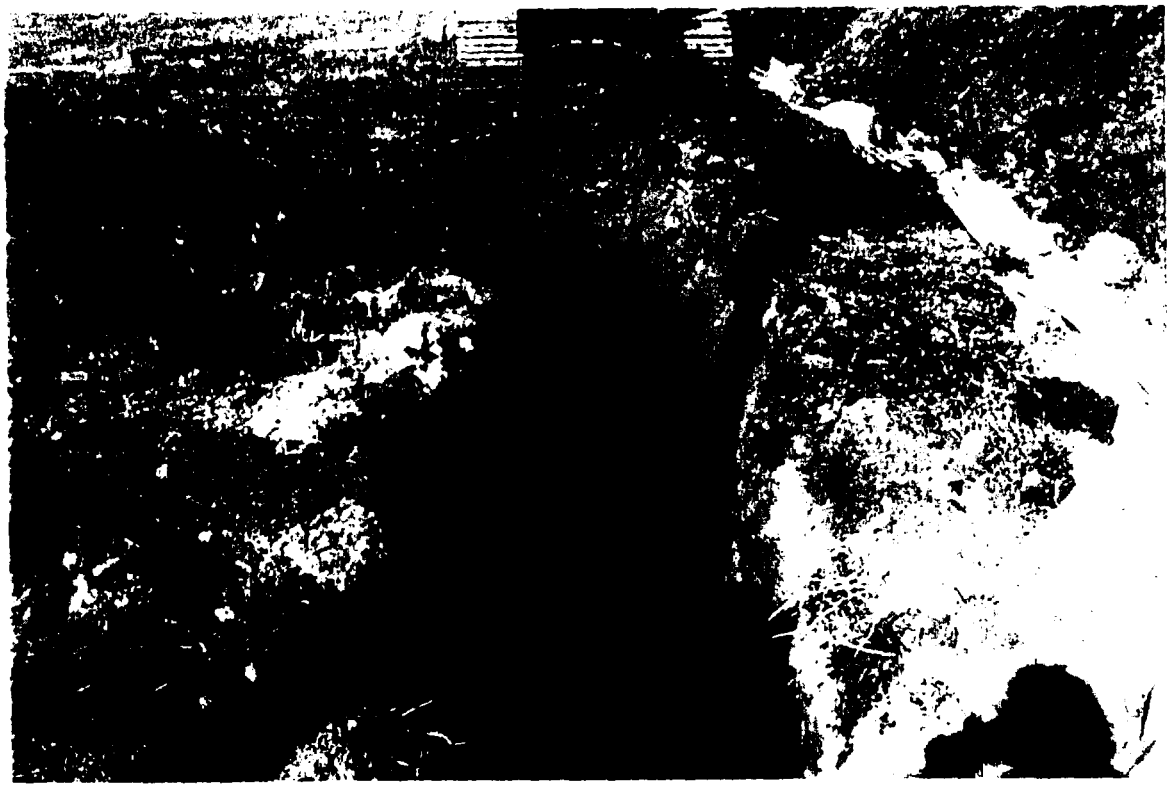
Site H boundary trenching, showing fill and discolored native material excavated from north boundary trench; Sept 1999

Site H boundary trenching, showing fill in west boundary trench; Sept 1999



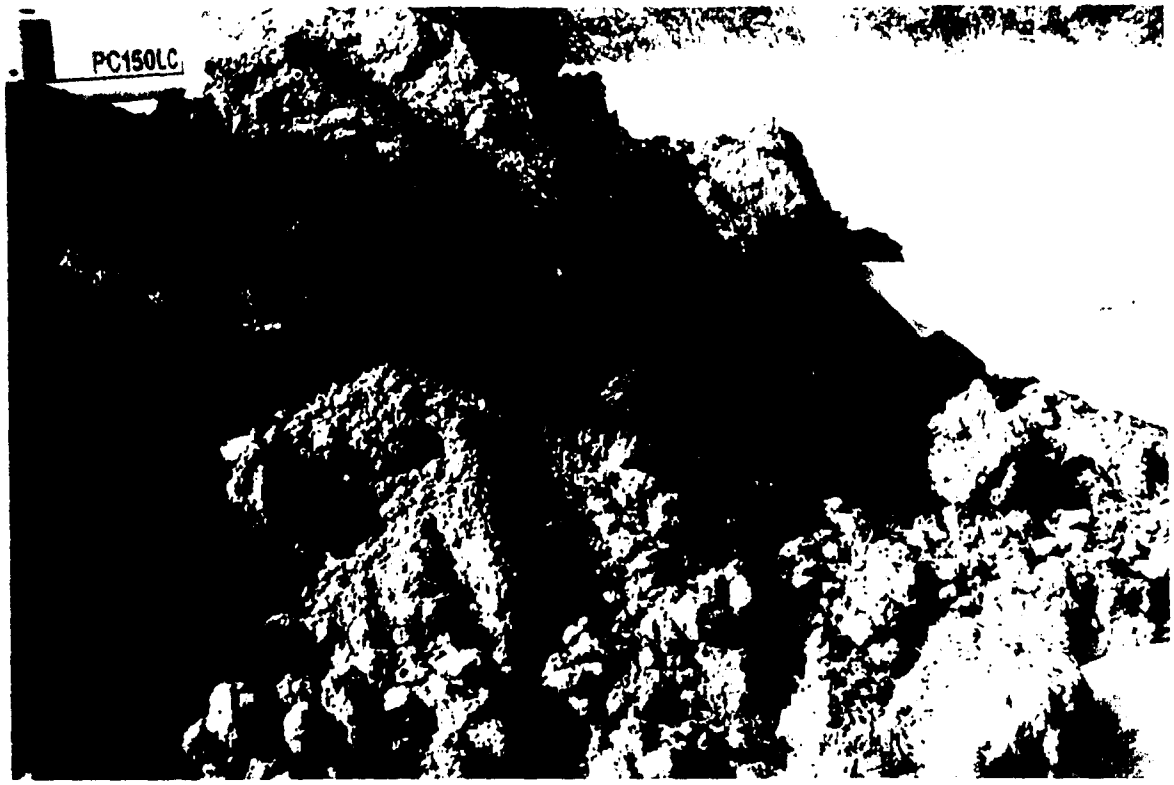
Site H boundary trenching, showing fill in west boundary trench; Sept 1999

Site H boundary trenching, showing fill and black native material excavated from west boundary trench, Sept 1999

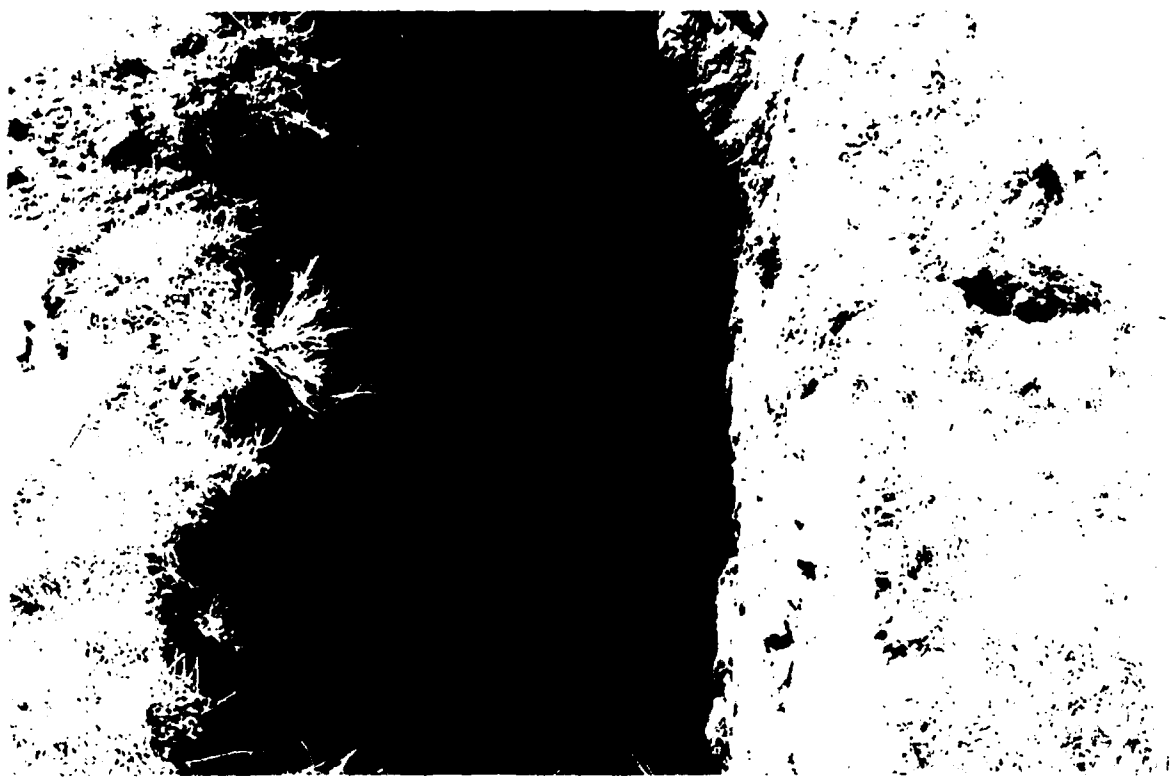


Site H boundary trenching, showing south boundary trench; Sept 1999

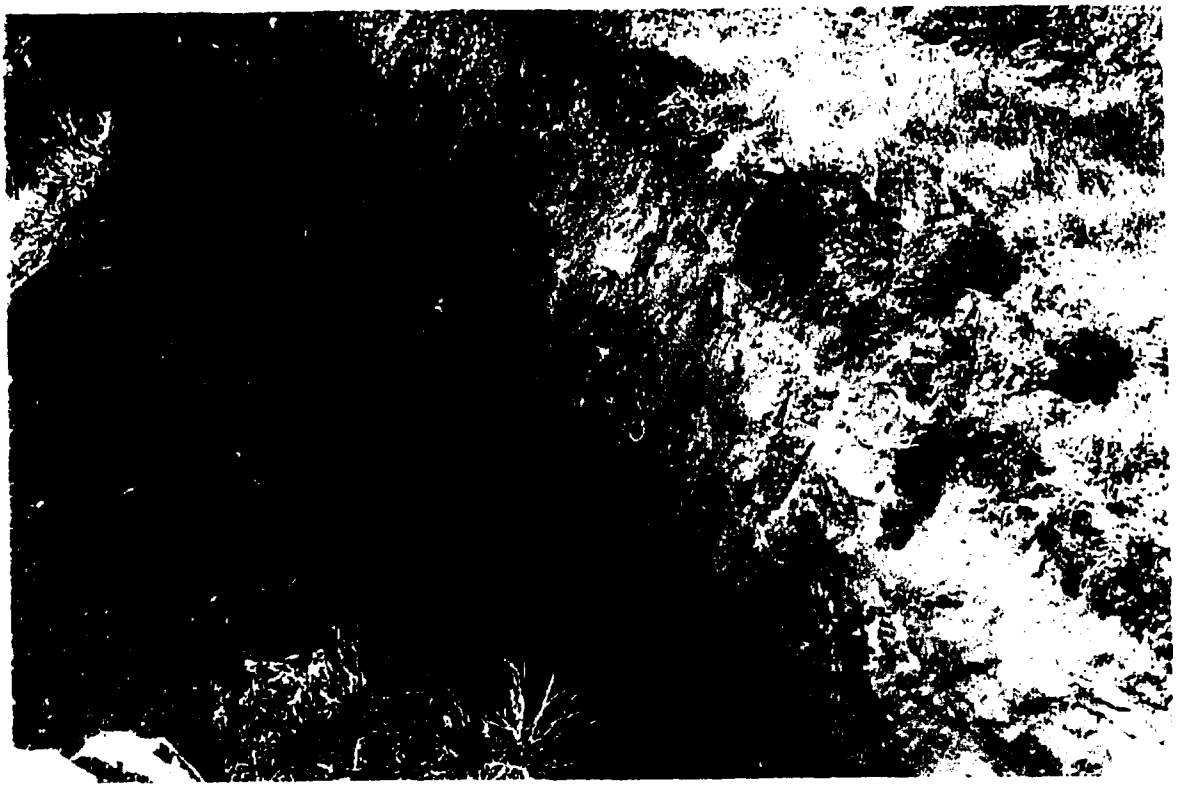
Site H boundary trenching, showing stained native material on wall of south boundary trench; Sept 1999



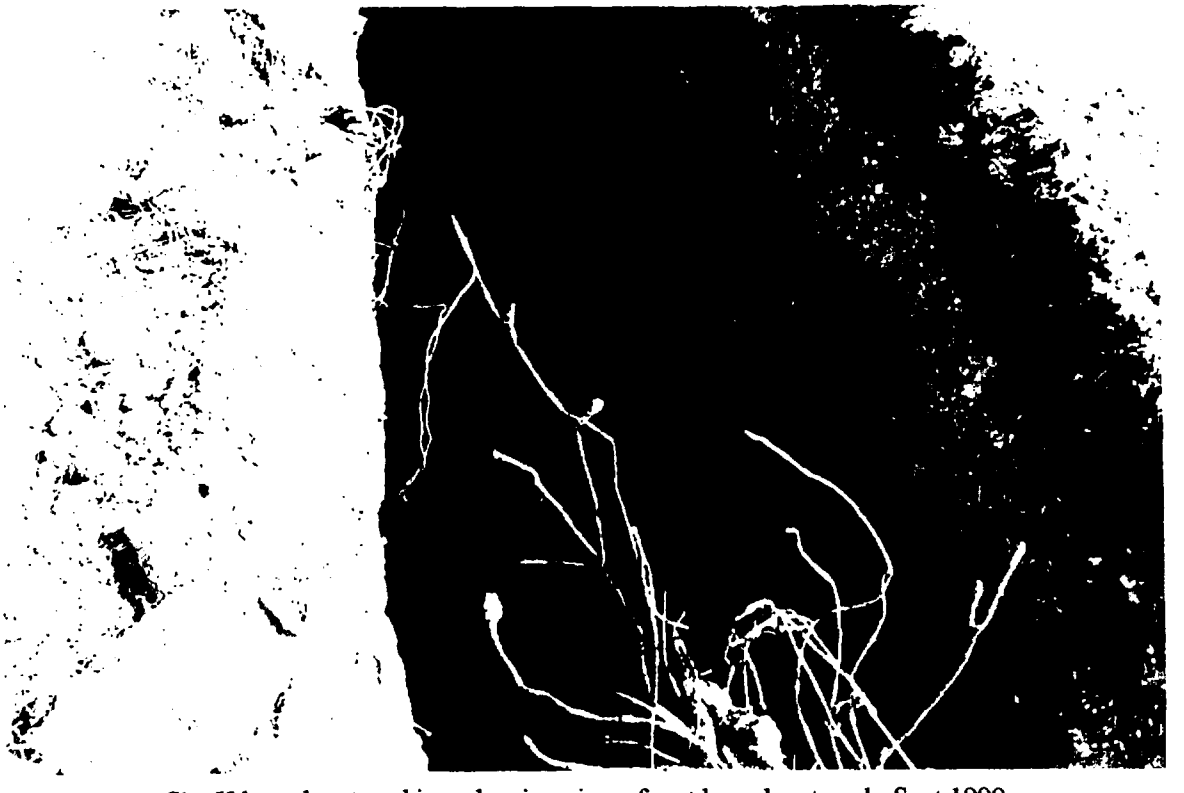
Site H boundary trenching, showing native material excavated from south boundary trench; Sept 1999



Site H boundary trenching, showing view of east boundary trench; Sept 1999

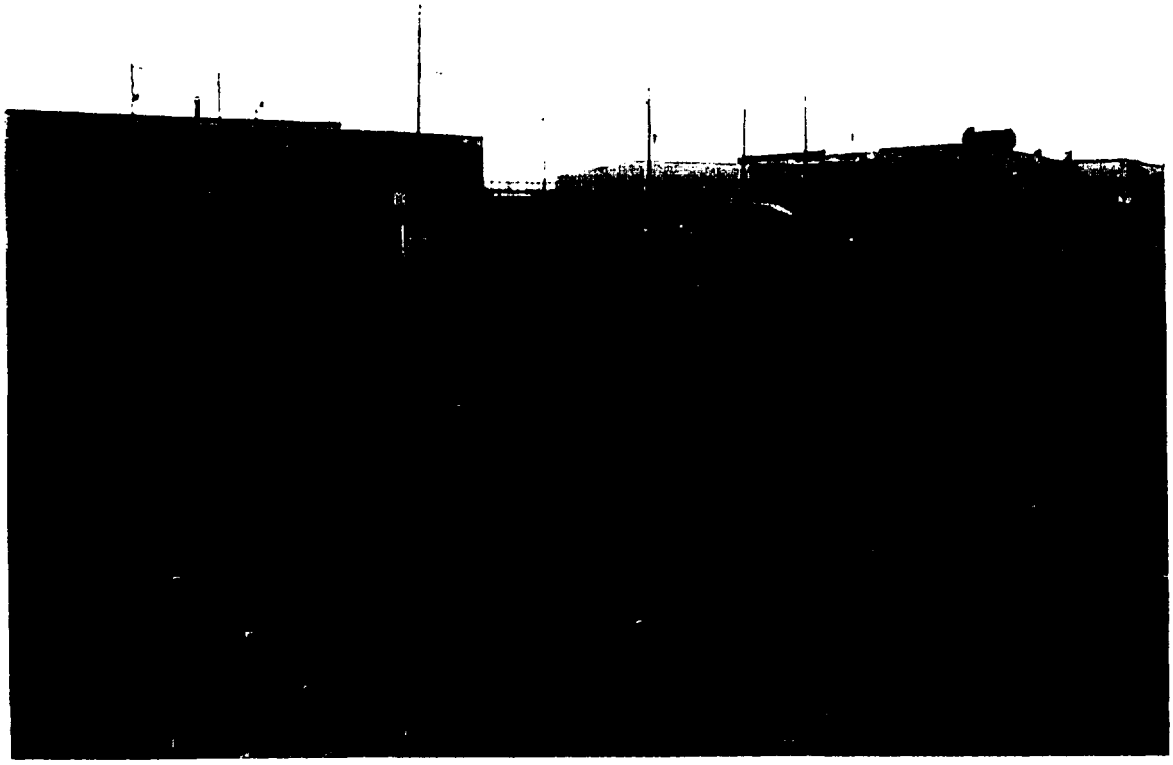


Site H boundary trenching, showing view of east boundary trench; Sept 1999



Site H boundary trenching, showing view of east boundary trench; Sept 1999

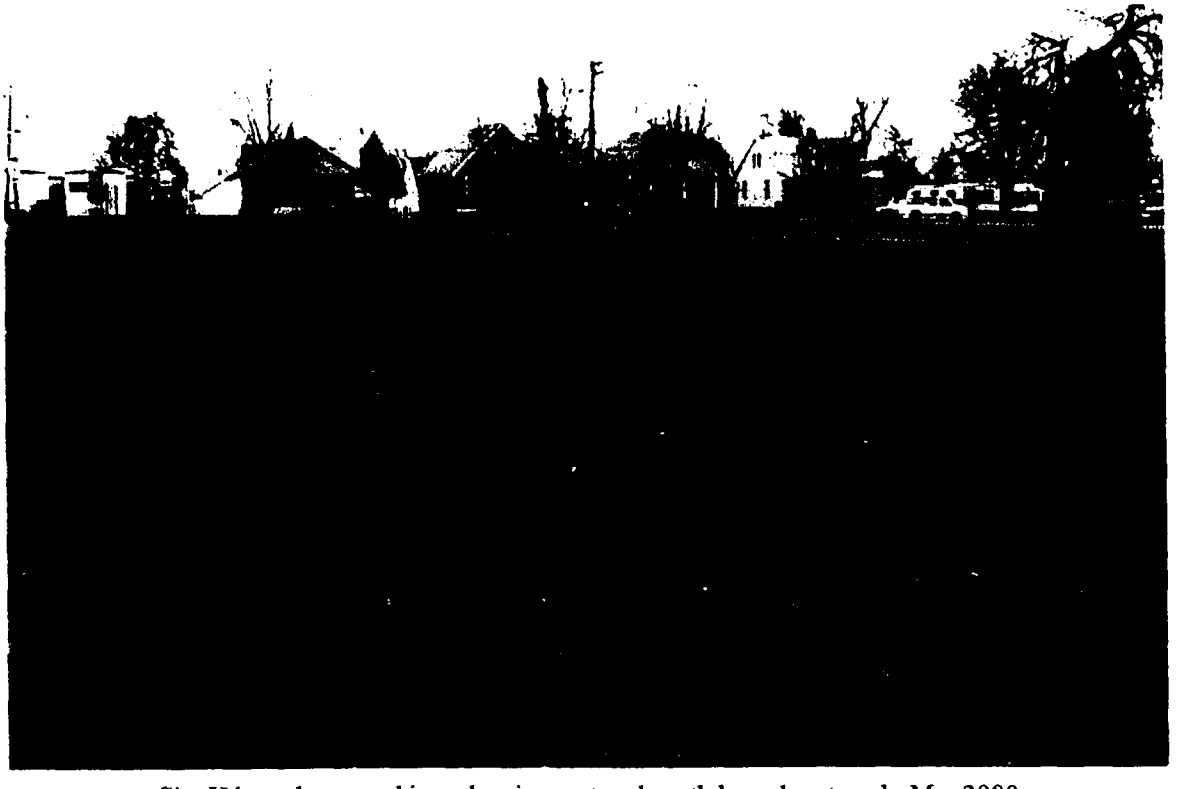
Site H boundary trenching, showing excavated native material from east boundary trench; Sept 1999



Site H boundary trenching, showing restored north boundary trench; Mar 2000

Site H boundary trenching, showing restored east boundary trench; Mar 2000

Site H boundary trenching, showing restored west boundary trench; Mar 2000



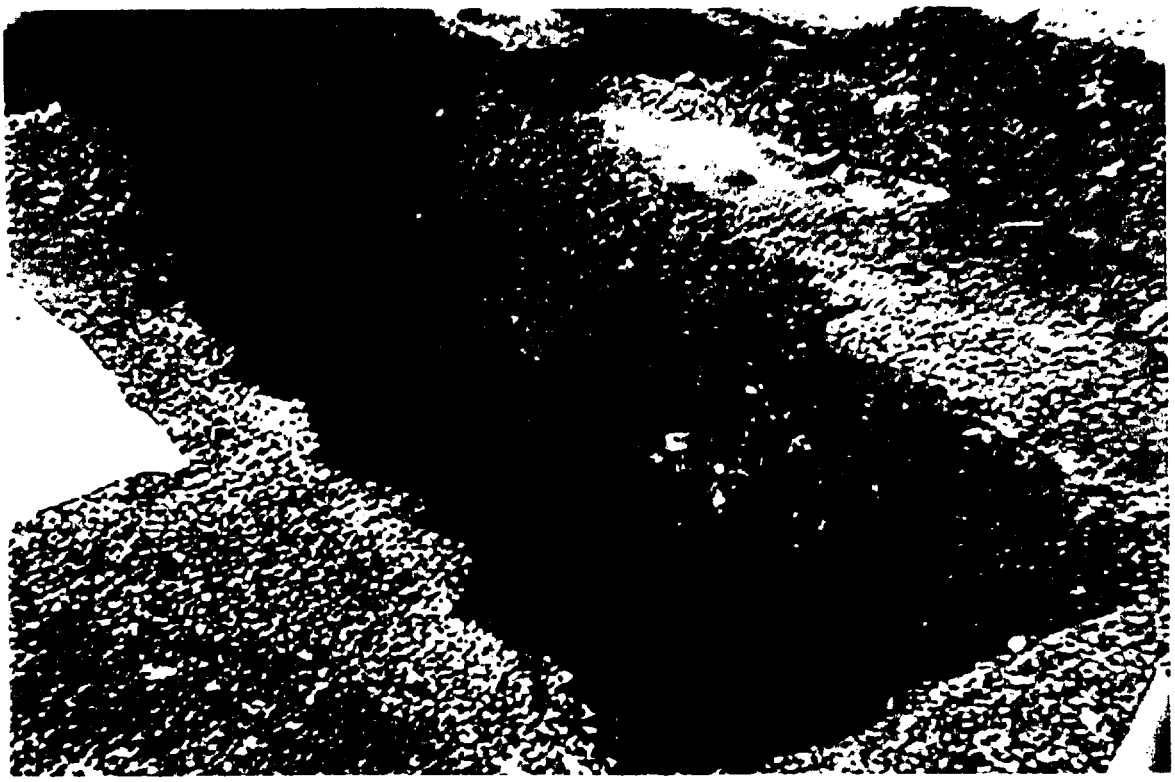
Site H boundary trenching, showing restored south boundary trench; Mar 2000

Site I boundary trenching, showing east and south edges of east boundary trench; Mar 2000

Site I boundary trenching, showing south edge and fill in east boundary trench; Mar 2000

Site I boundary trenching, showing south edge and bricks on side walls of east boundary trench; Mar 2000

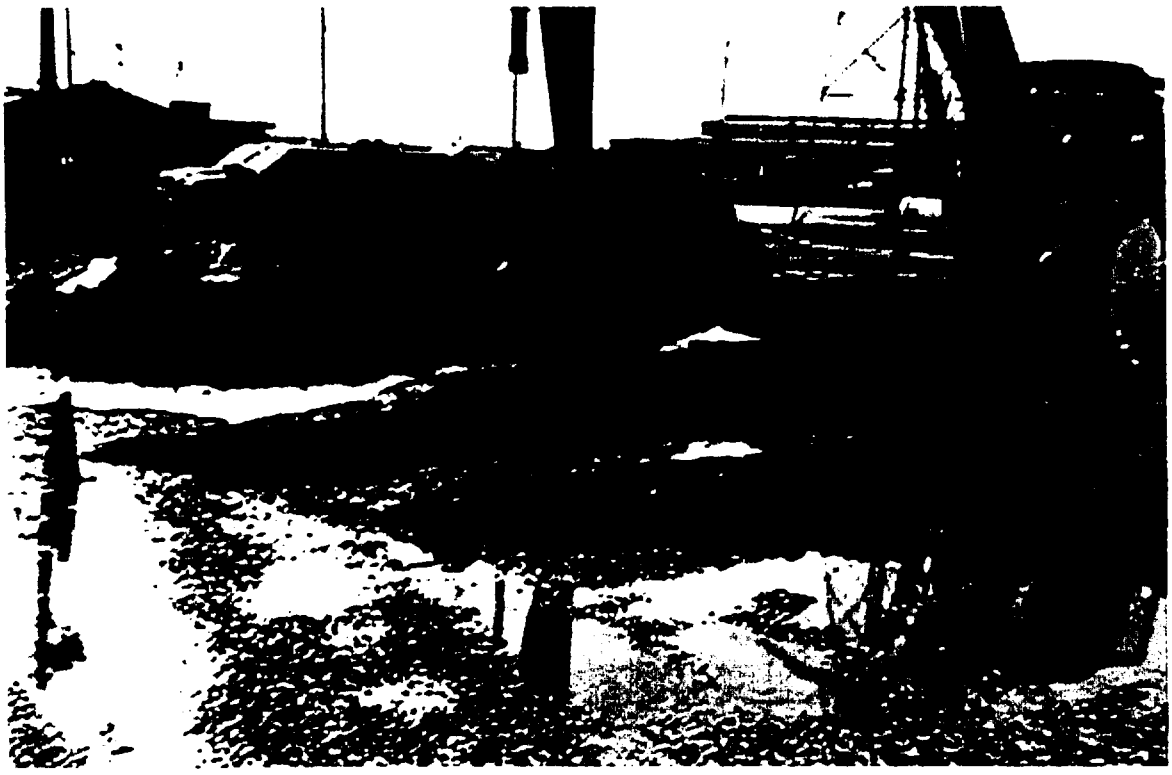
Site I boundary trenching, showing southeast corner of east boundary trench; Mar 2000



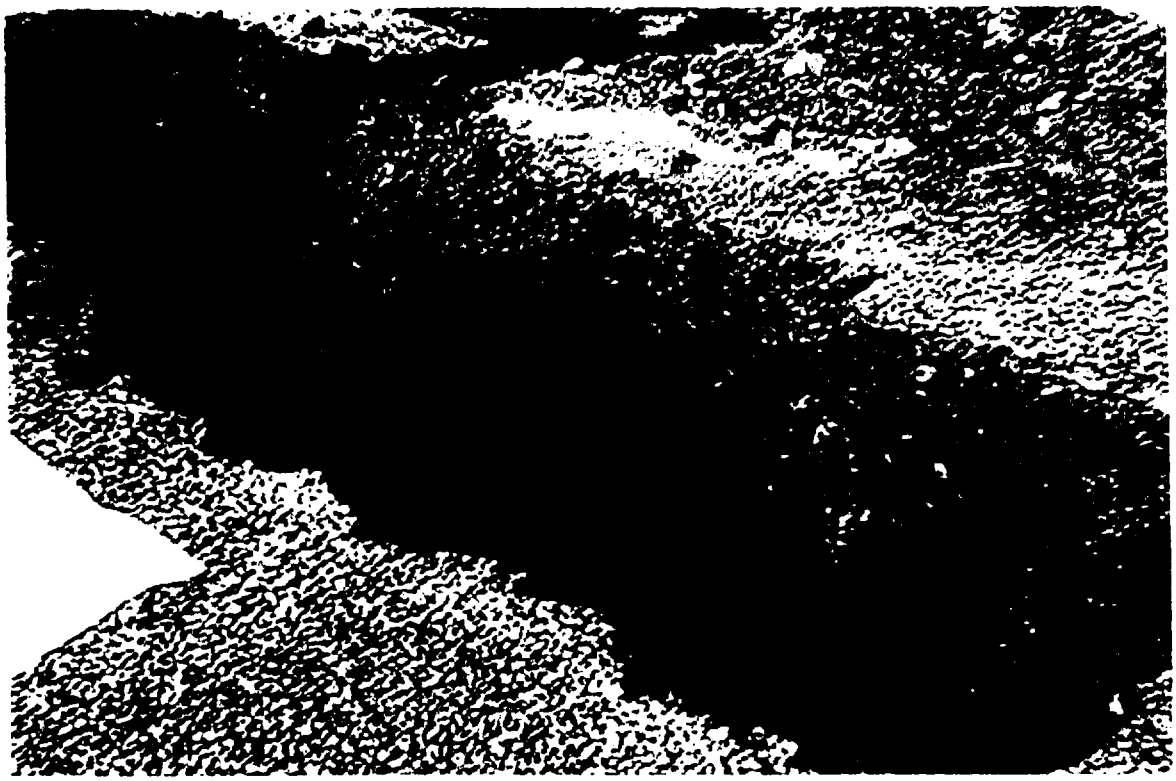
Site I boundary trenching, showing NE side of east boundary trench; Mar 2000

Site I boundary trenching, showing southern wall and fill boundary of east boundary trench; Mar 2000

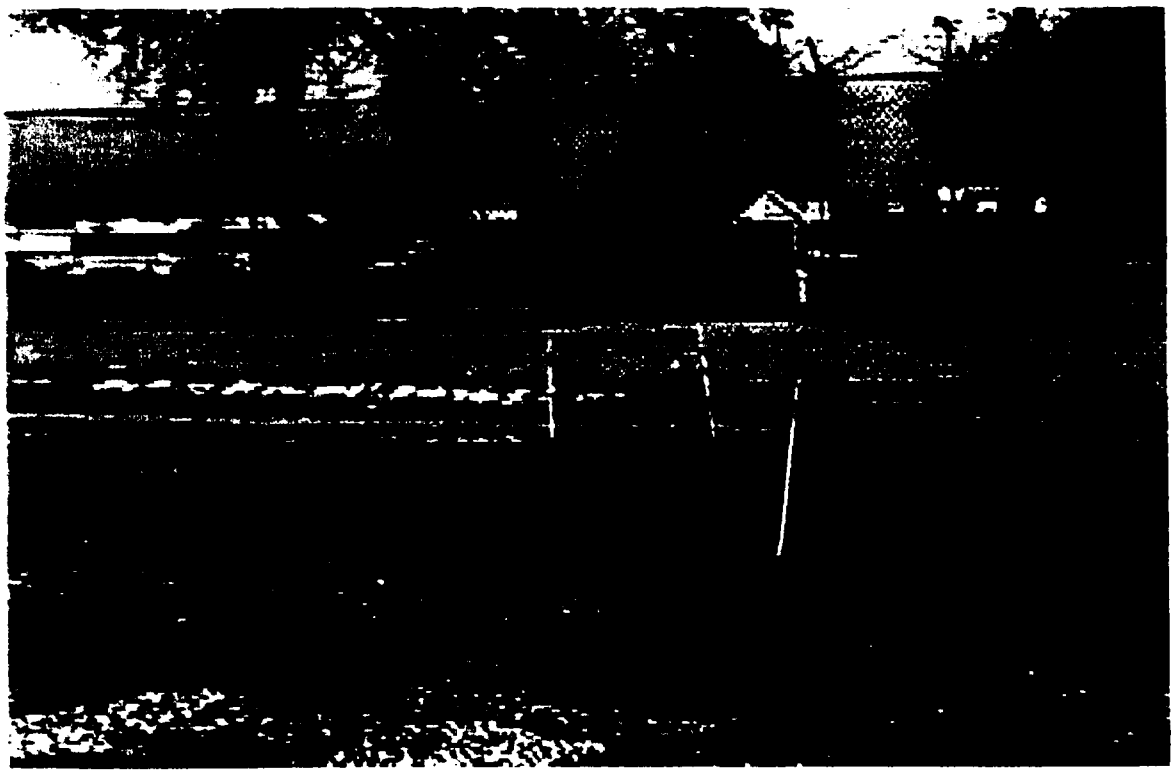
Site I boundary trenching, showing native material of east boundary trench; Mar 2000



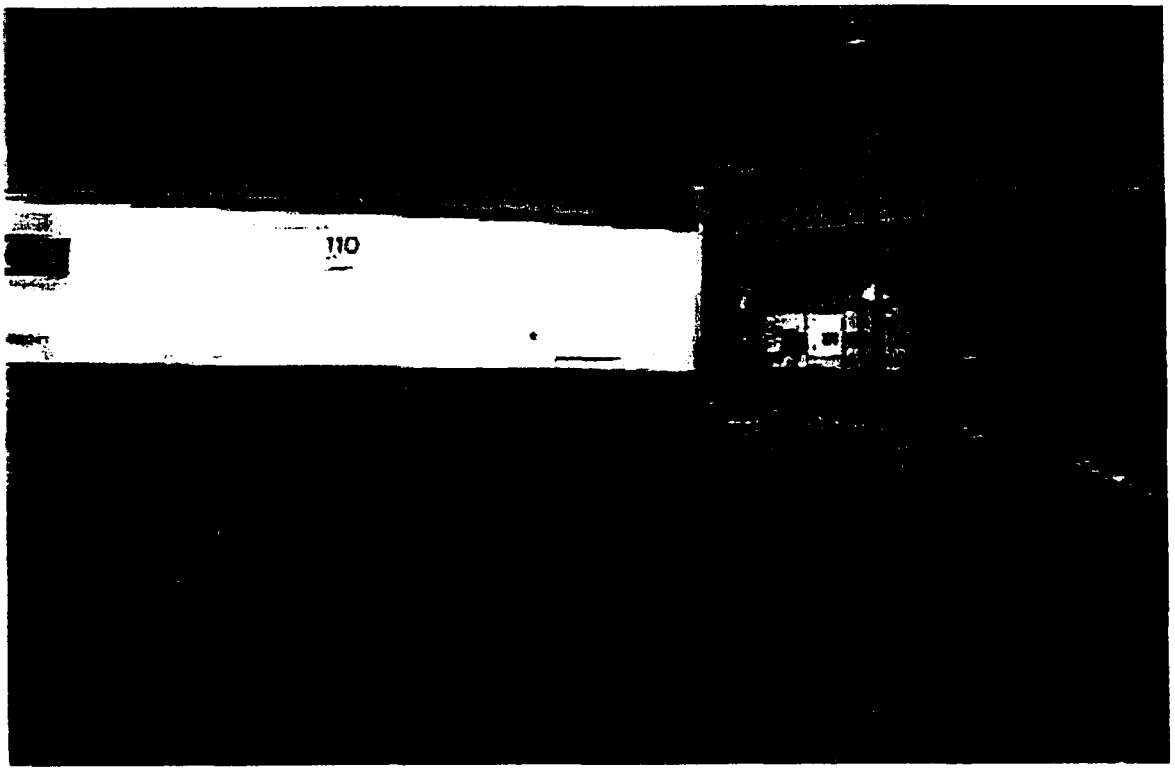
Site I boundary trenching, showing overview of east boundary trench; Mar 2000



Site I boundary trenching, showing native and fill stratifications in east boundary trench; Mar 2000

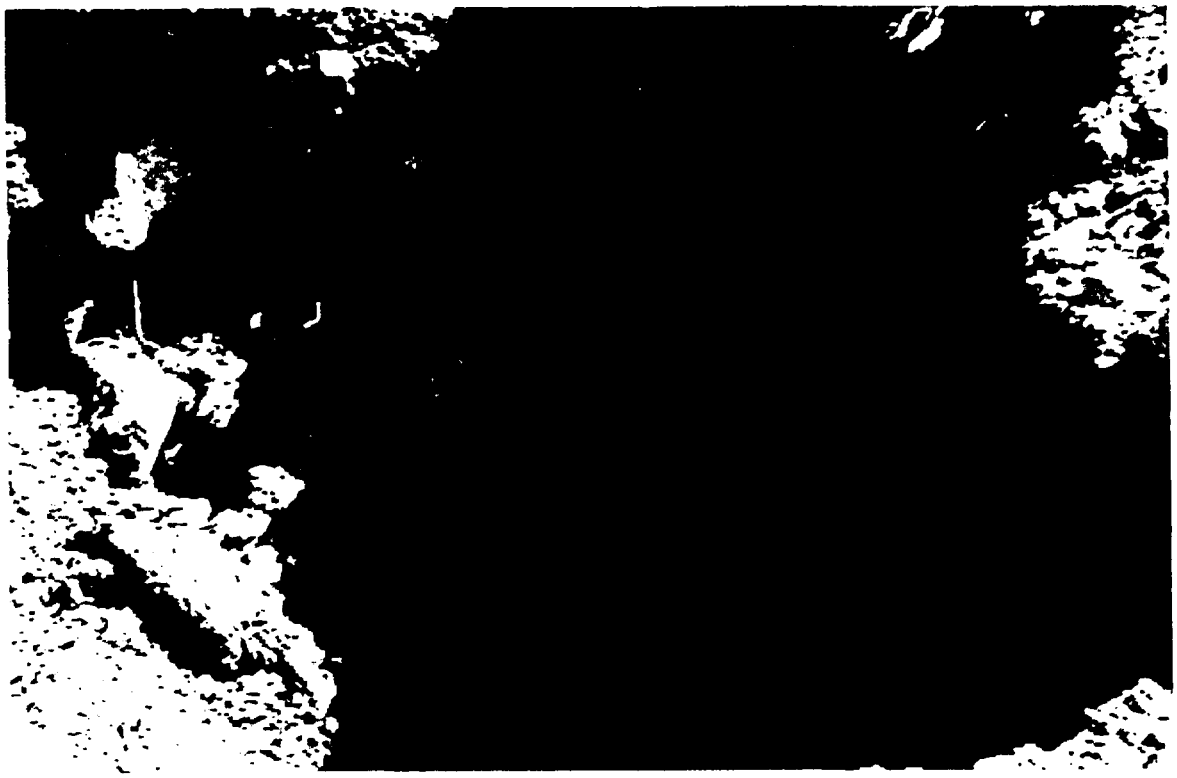


Site I boundary trenching, showing restored east boundary trench site facing east; Mar 2000

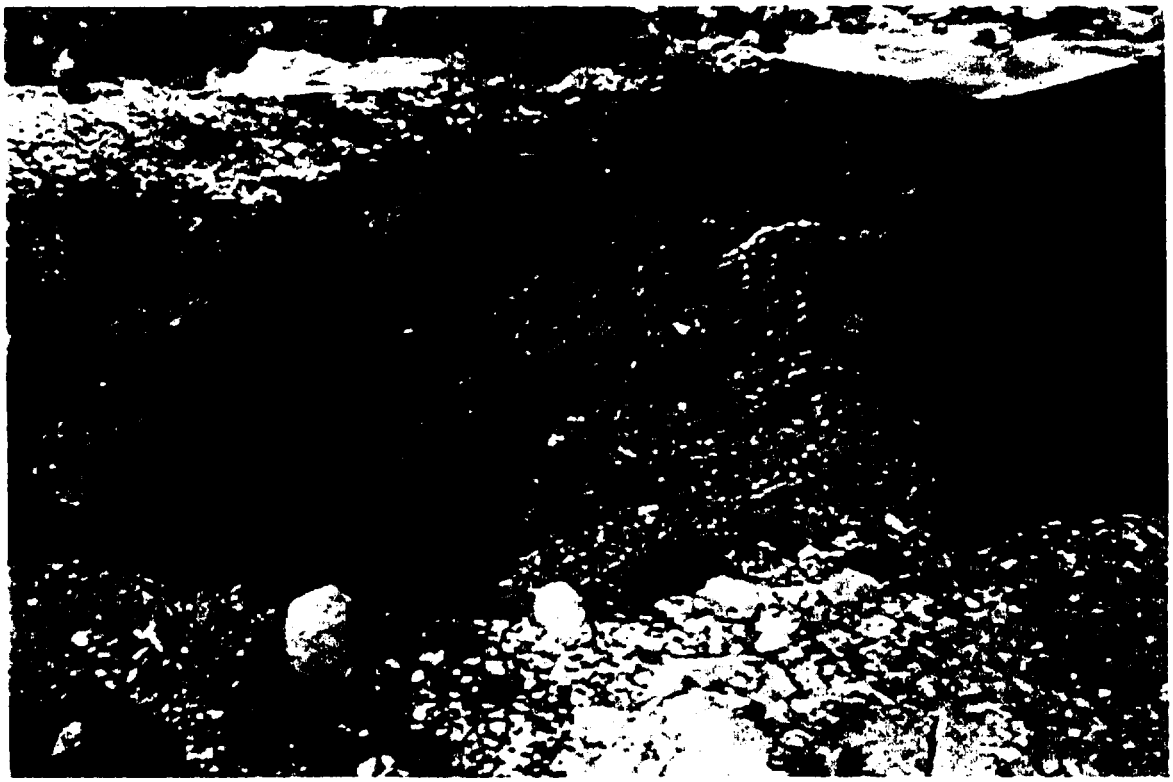


Site I boundary trenching, showing restored east boundary trench site facing north;
Mar 2000

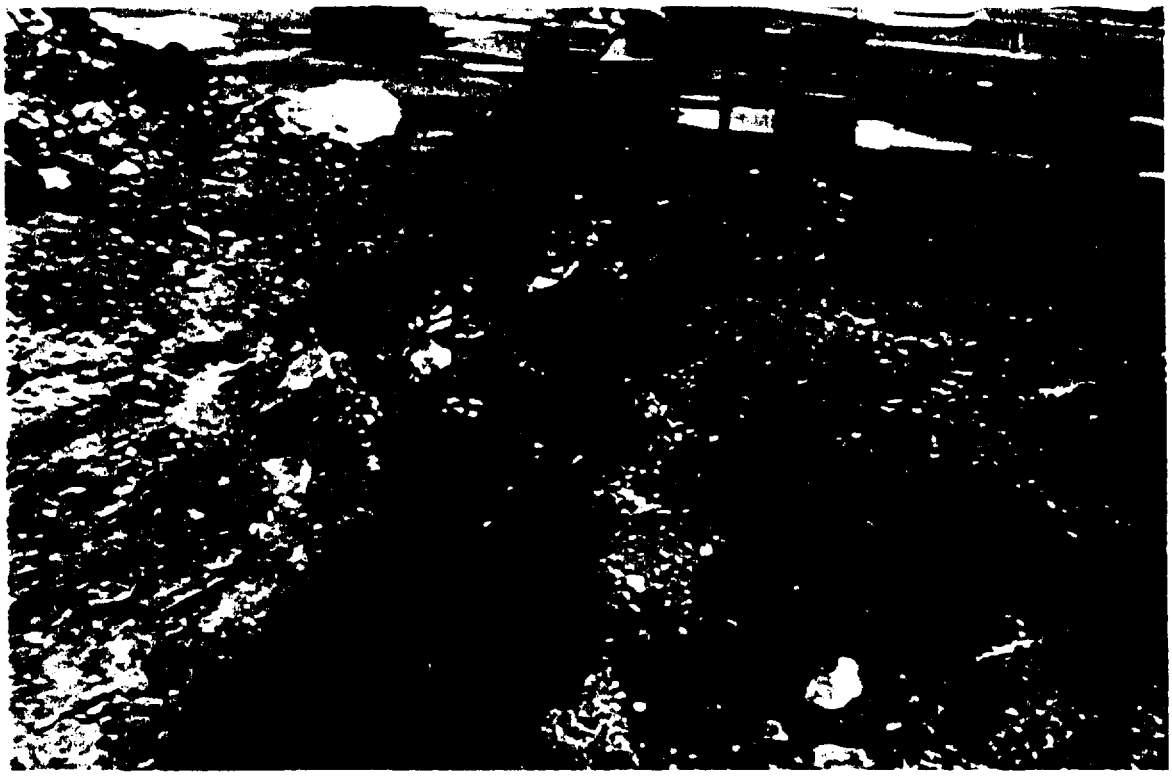
Site I boundary trenching, showing entire north boundary trench facing north; Mar 2000



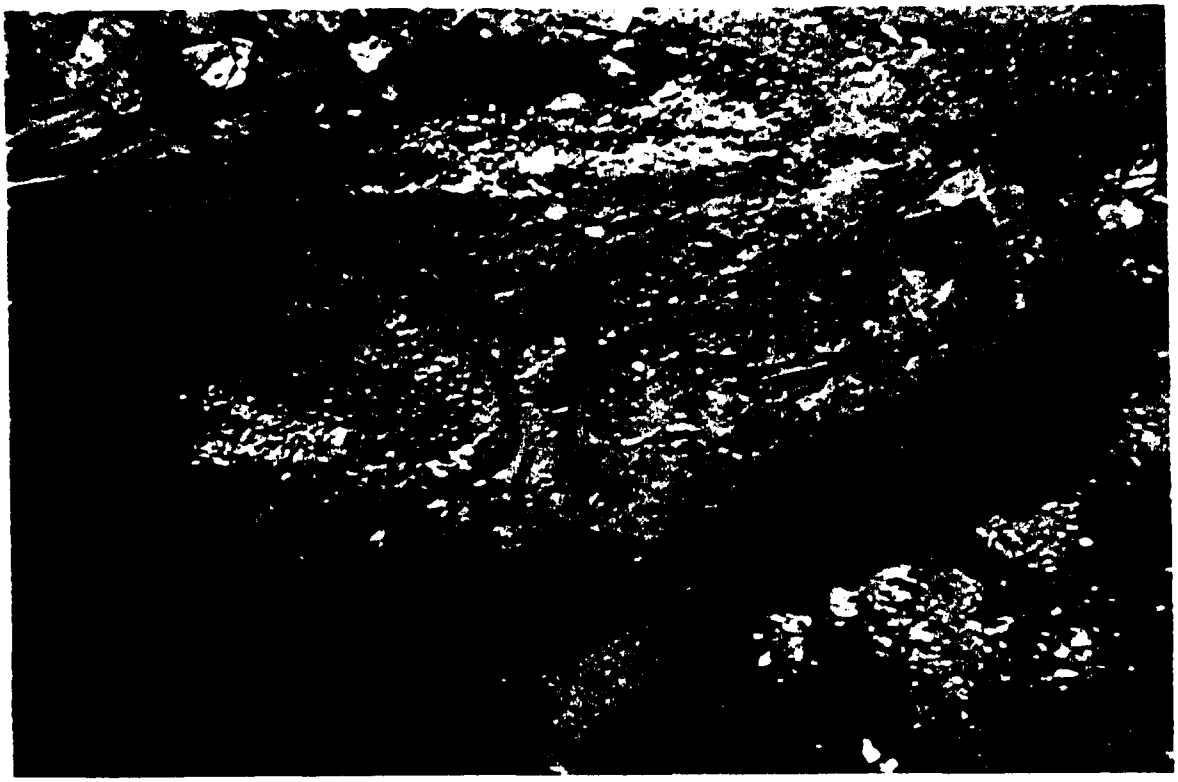
Site I boundary trenching, showing eastern edge of north boundary trench; Mar 2000



Site I boundary trenching, showing western edge of native and fill area of north boundary trench; Mar 2000



Site I boundary trenching, showing northwest edge of north boundary trench; Mar 2000



Site I boundary trenching, showing western edge of north boundary trench; Mar 2000

Site I boundary trenching, showing eastern edge and bottom of north boundary trench; Mar 2000

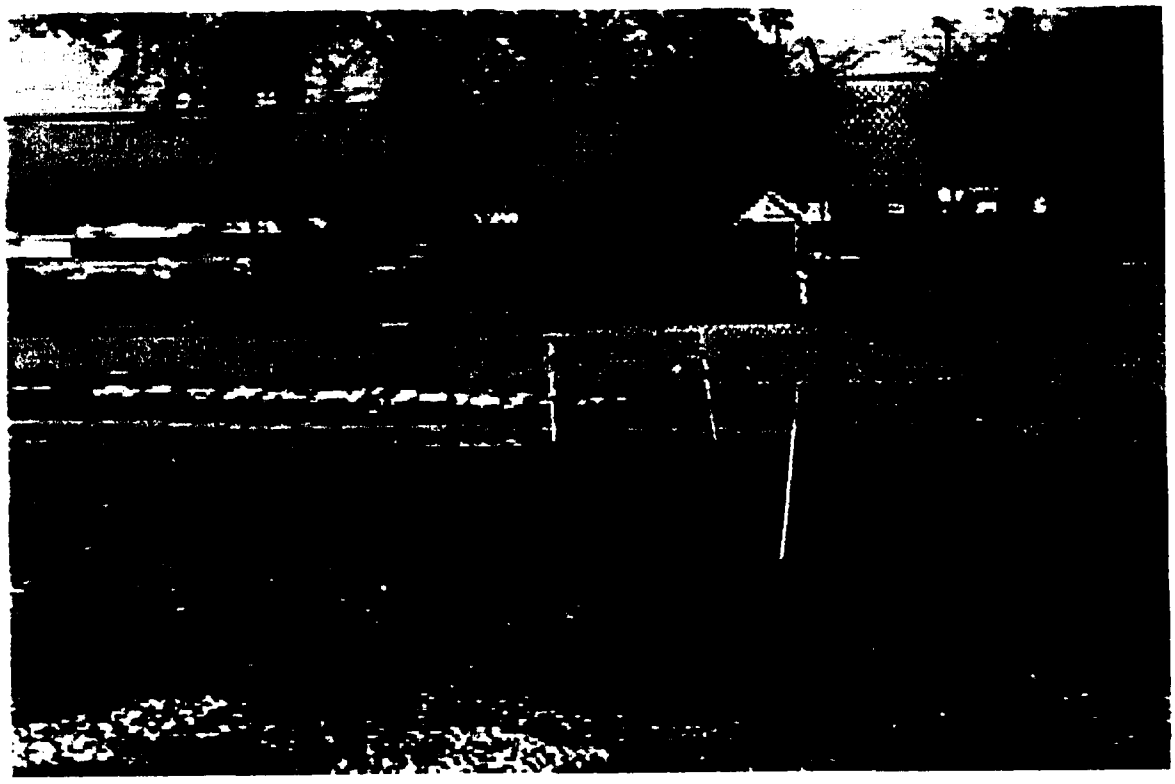
Site I boundary trenching, showing eastern edge fill and native layers of north boundary trench; Mar 2000

Site I boundary trenching, showing fill pile facing south of north boundary trench; Mar 2000

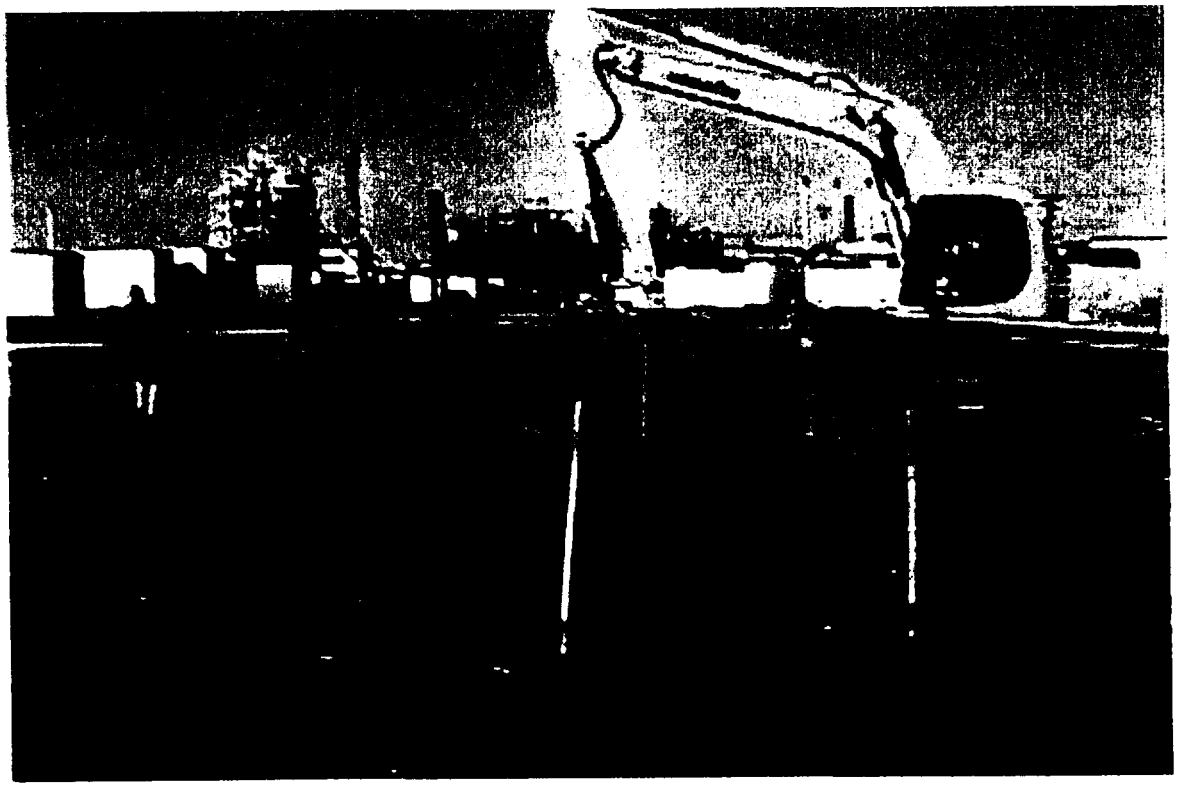
Site I boundary trenching, showing surface pile from north boundary trench facing southeast; Mar 2000

Site I boundary trenching, showing overview of north boundary trench area facing north; Mar 2000

Site I boundary trenching, showing concrete slabs in fill pile from north boundary trench; Mar 2000



Site I boundary trenching, showing restored east boundary trench site facing east; Mar 2000



Site I boundary trenching, showing restored north boundary trench; Mar 2000

Site I boundary trenching, showing restored north boundary trench; Mar 2000

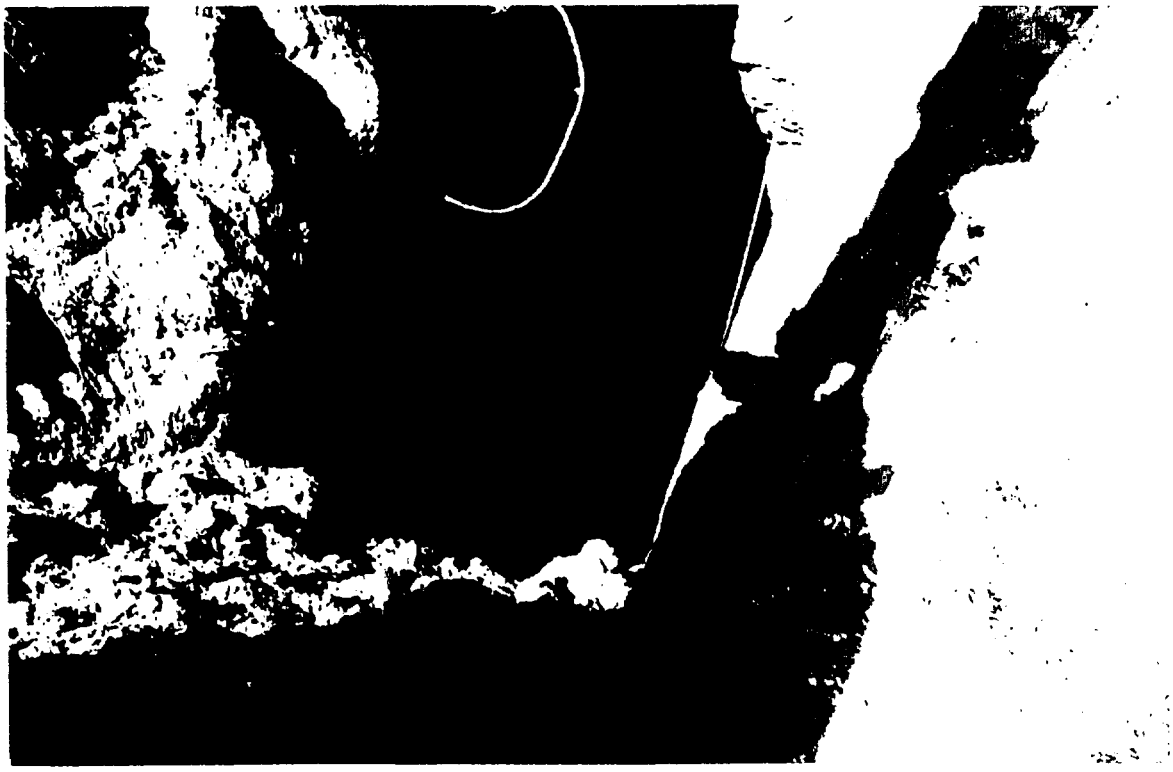
Site L boundary trenching, showing east boundary trench at ground-break; Sept 1999

Site L boundary trenching, showing east boundary trench; Sept 1999

Site L boundary trenching, showing fill and native material excavated from east boundary trench; Sept 1999

Site L boundary trenching, showing bottom of east boundary trench; Sept 1999

Site L boundary trenching, showing east boundary trench; Sept 1999



Site L boundary trenching, showing groundwater at bottom of east boundary trench; Sept 1999

Site L boundary trenching, showing east boundary trench; Sept 1999

Site L boundary trenching, showing native and fill material on wall of east boundary trench; Sept 1999

Site L boundary trenching, showing east boundary trench; Sept 1999

Site L boundary trenching, showing native material excavated from east boundary trench; Sept 1999

Site L boundary trenching, showing native material excavated from east boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in west boundary trench; Sept 1999

Site L boundary trenching, showing east view west boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in west boundary trench; Sept 1999

Site L boundary trenching, showing west boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in south boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in south boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in south boundary trench; Sept 1999

Site L boundary trenching, showing south boundary trench; Sept 1999

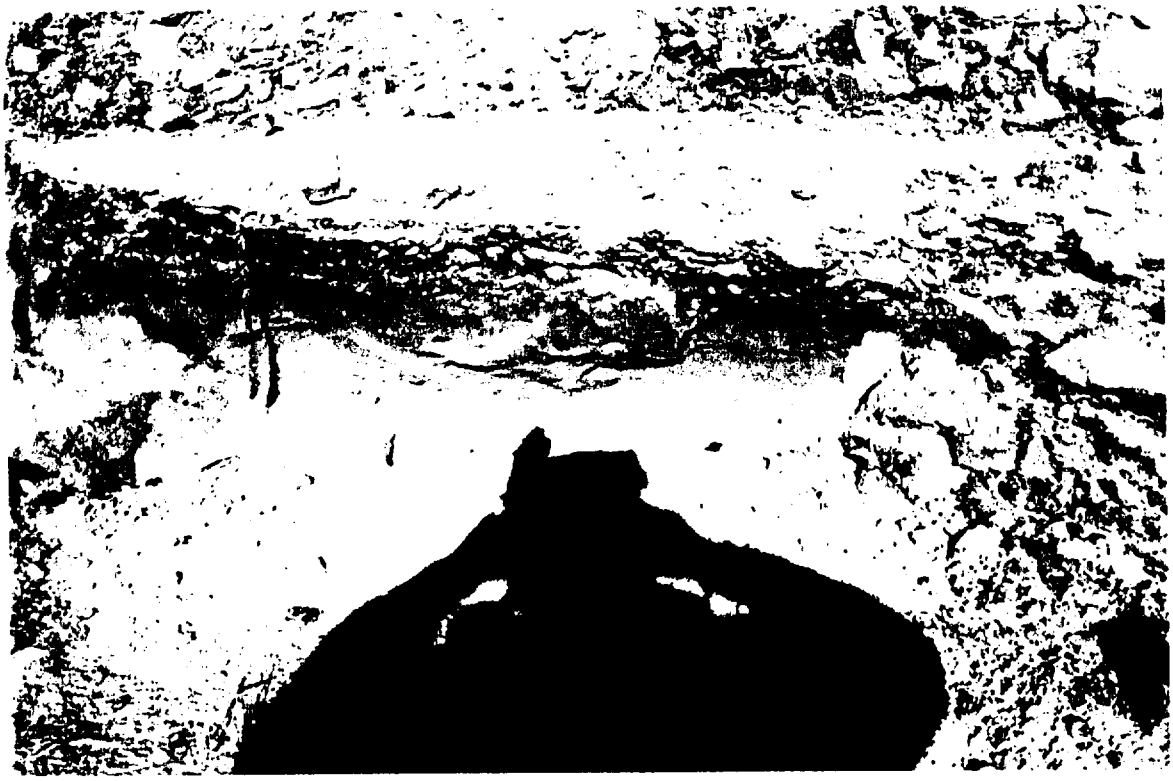
Site L boundary trenching, showing south boundary trench; Sept 1999

Site L boundary trenching, showing groundwater in bottom of north boundary trench; Sept 1999

Site L boundary trenching, showing north boundary trench; Sept 1999

Site L boundary trenching, showing excavated native material from north boundary trench; Sept 1999

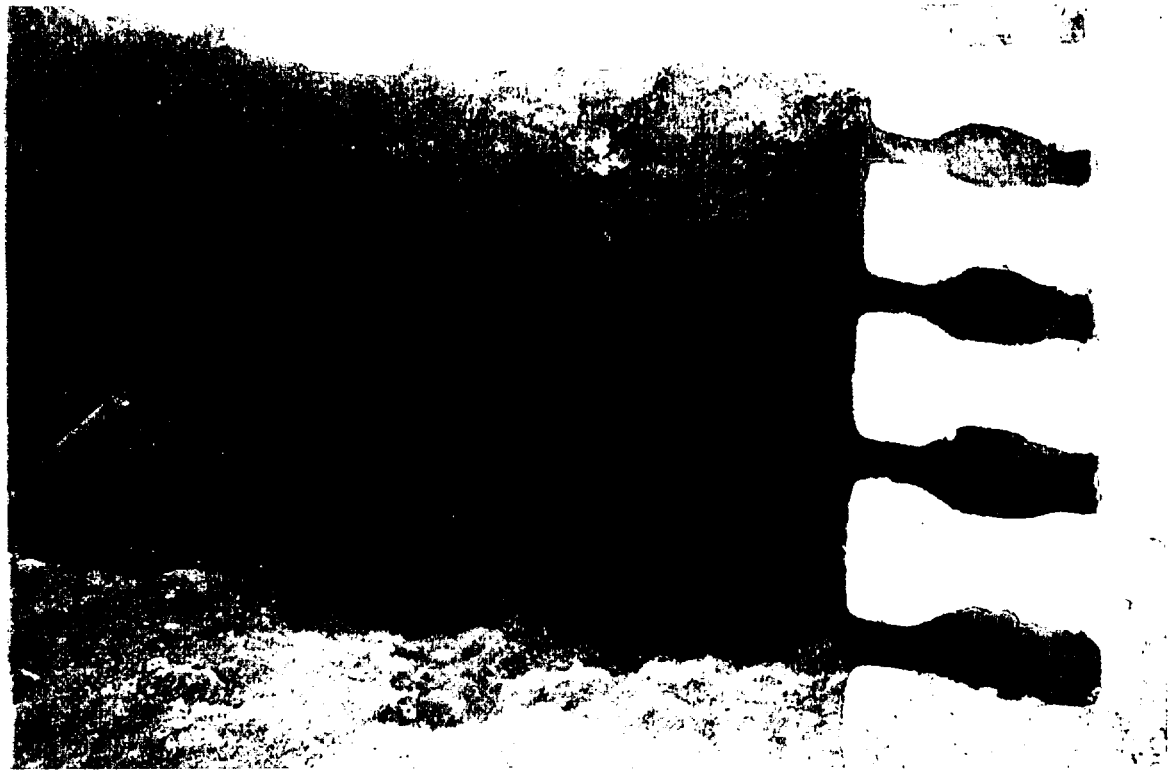
Site L boundary trenching, showing excavated native material from north boundary trench; Sept 1999



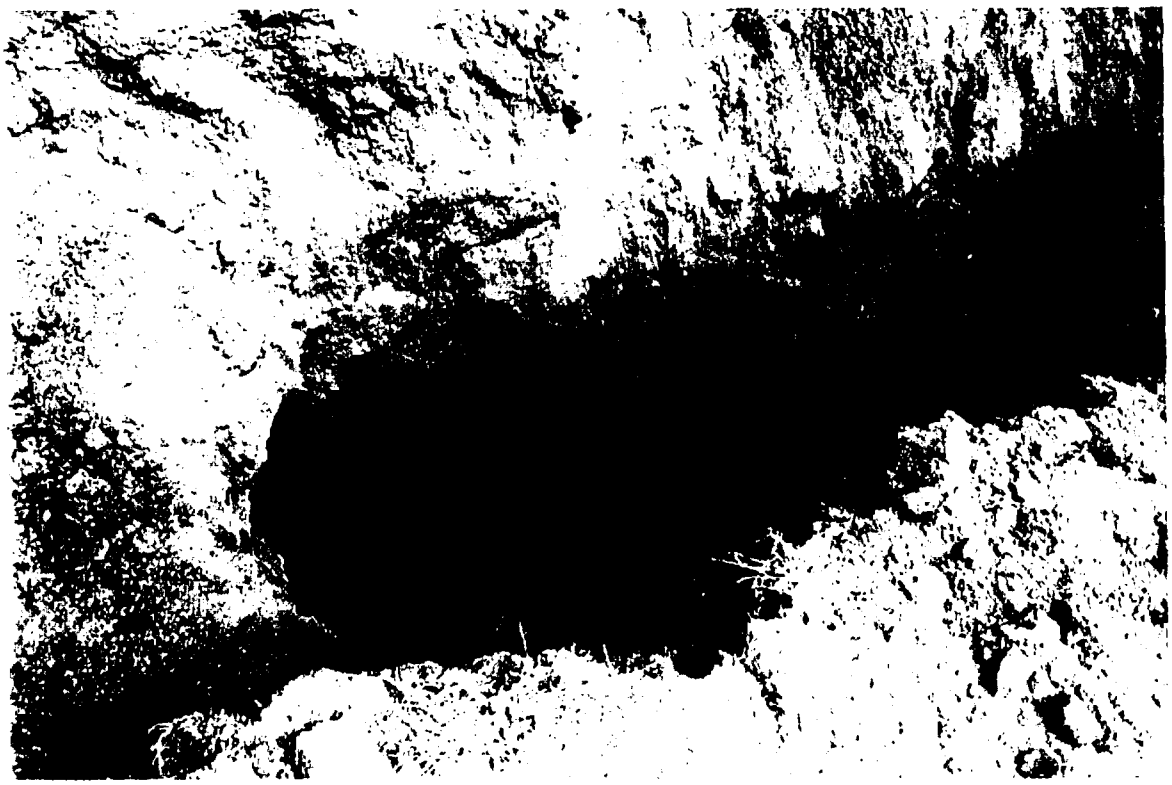
Site L boundary trenching, showing fill and native material in wall of north boundary trench; Sept 1999

Site L boundary trenching, showing north boundary trench looking south; Sept 1999

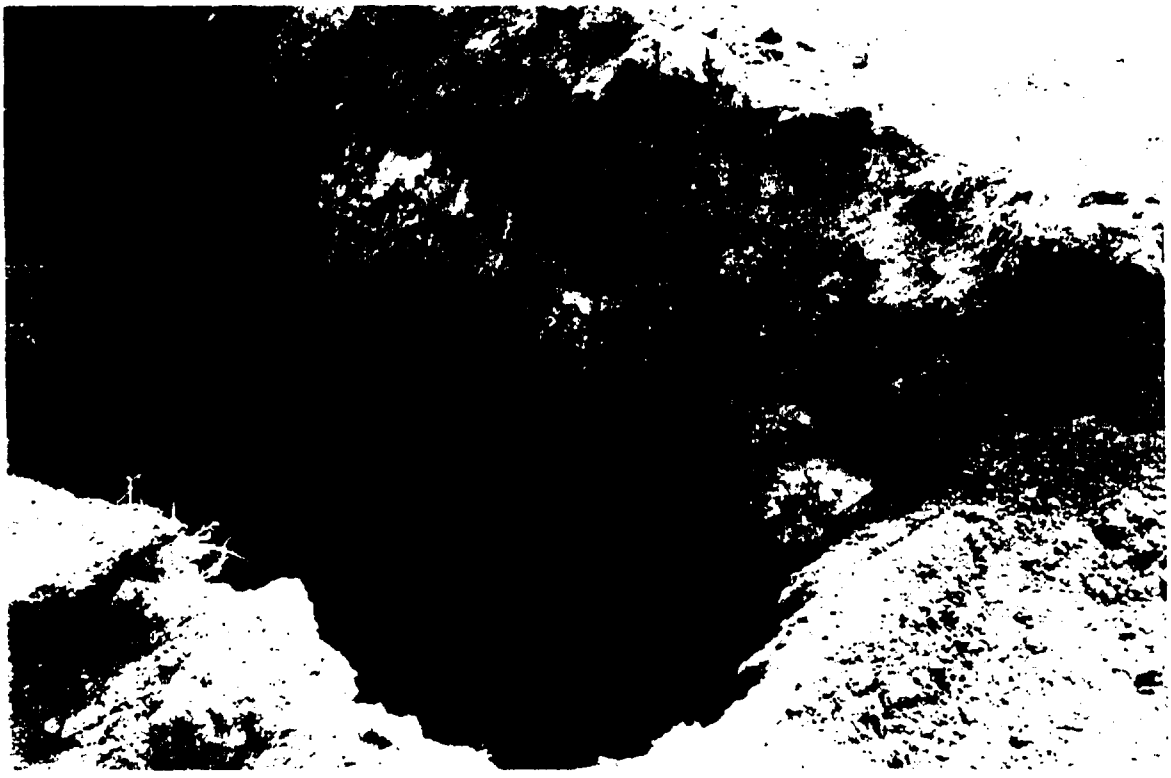
Site L boundary trenching, showing fill in north boundary trench; Sept 1999



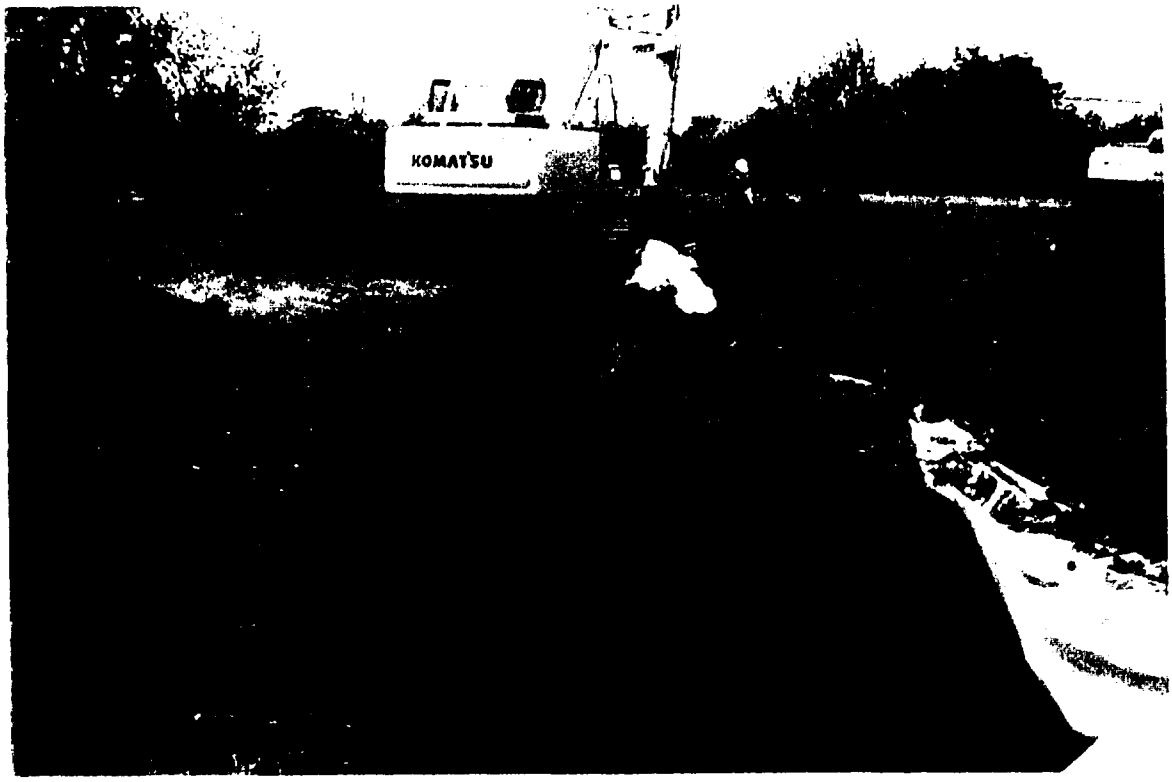
Site L boundary trenching, showing fill in north boundary trench; Sept 1999



Site L boundary trenching, showing stained soil on north wall of second east boundary trench; Sept 1999



Site L boundary trenching, showing stained soil on south wall of second east boundary trench; Sept 1999



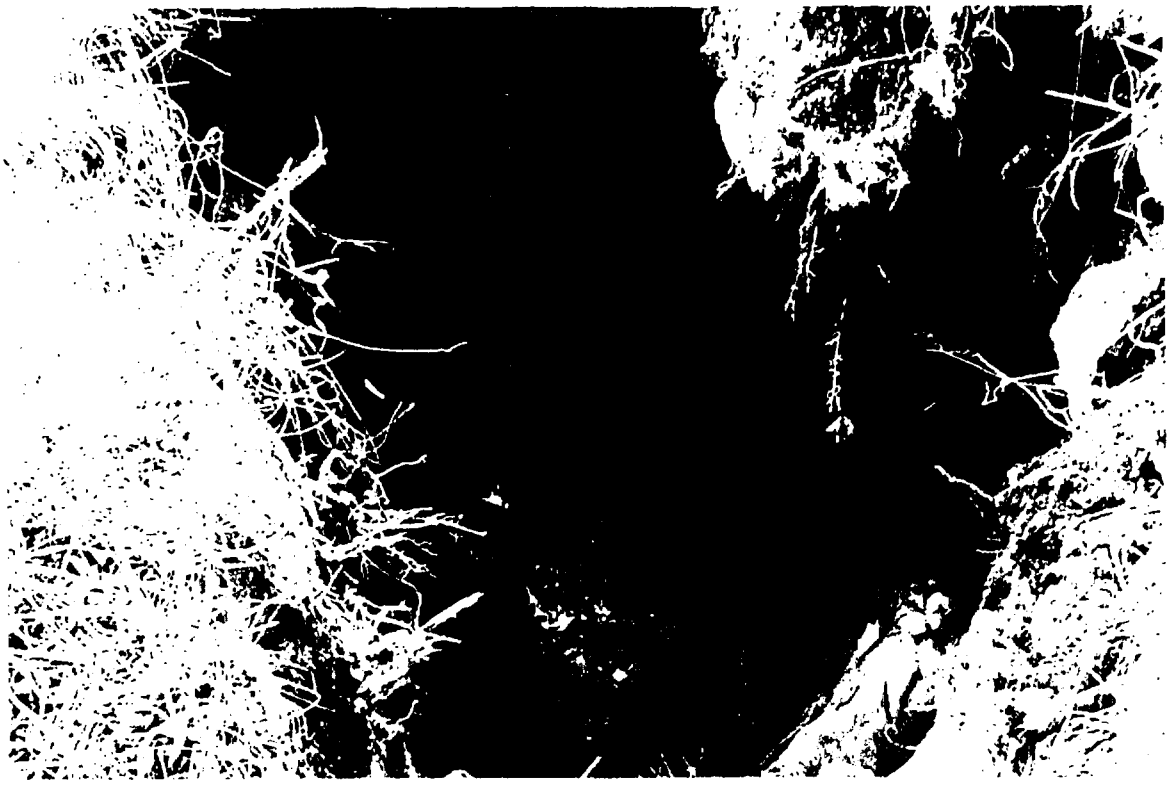
Site L boundary trenching, showing second east boundary trench looking west; Sept 1999

Site L boundary trenching, showing native material excavated from second east boundary trench; Sept 1999

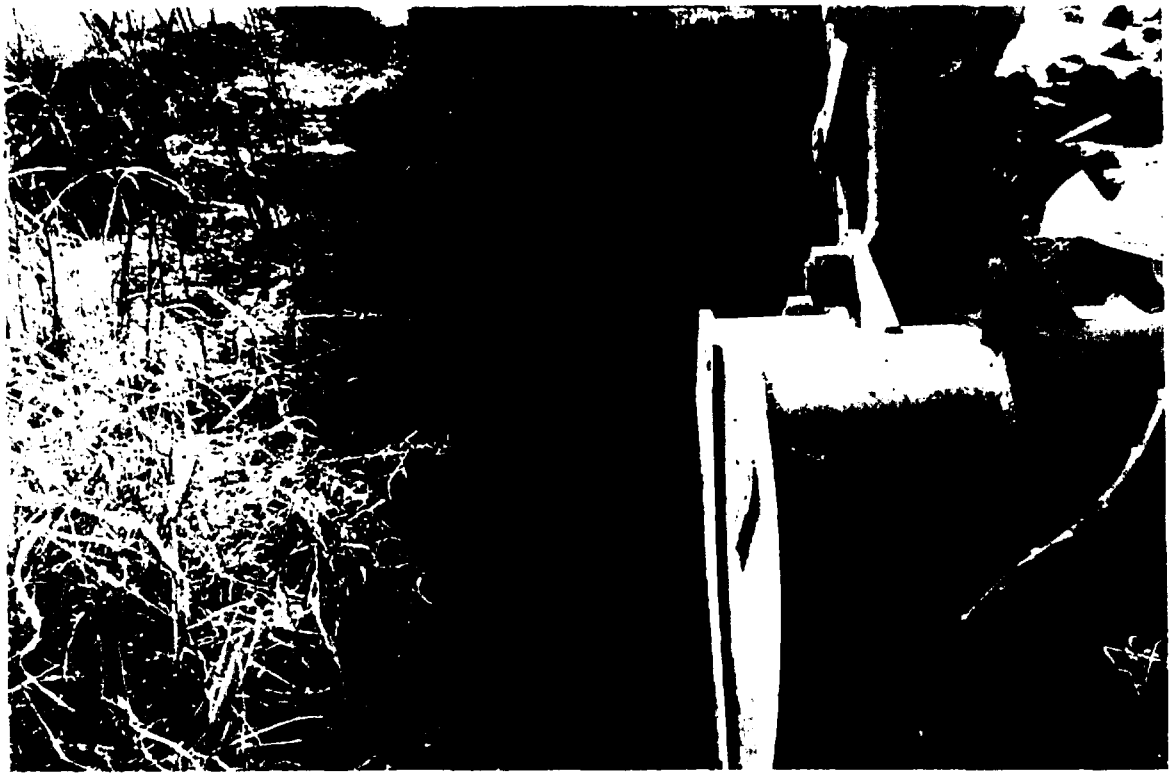
Site L boundary trenching, showing native material excavated from second east boundary trench; Sept 1999

Site L boundary trenching, showing stained soil in second east boundary trench looking west; Sept 1999

N



Site N boundary trenching, showing north boundary trench with ground water on bottom; Feb 2000

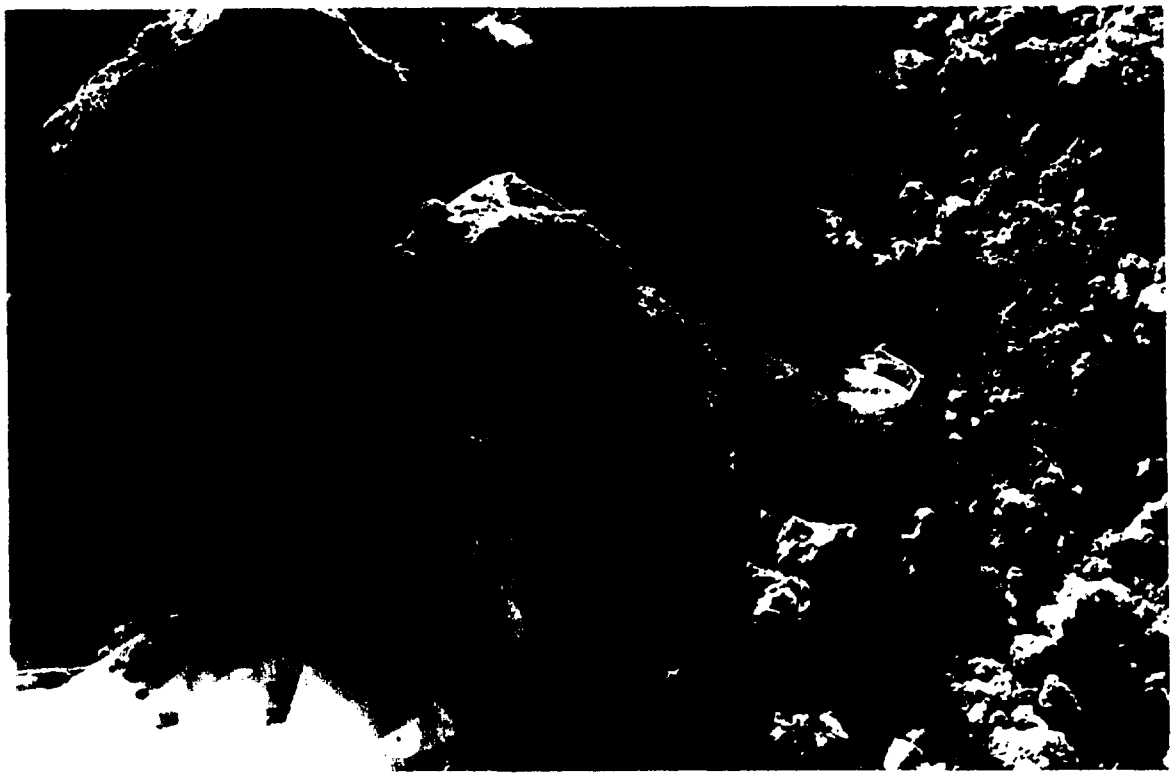


Site N boundary trenching, showing north boundary trench facing south; Feb 2000

Site N boundary trenching, showing west wall of north boundary trench; Feb 2000

Site N boundary trenching, showing west wall of north boundary trench; Feb 2000

Site N boundary trenching, showing soil/debris pile of north boundary trench; Feb 2000



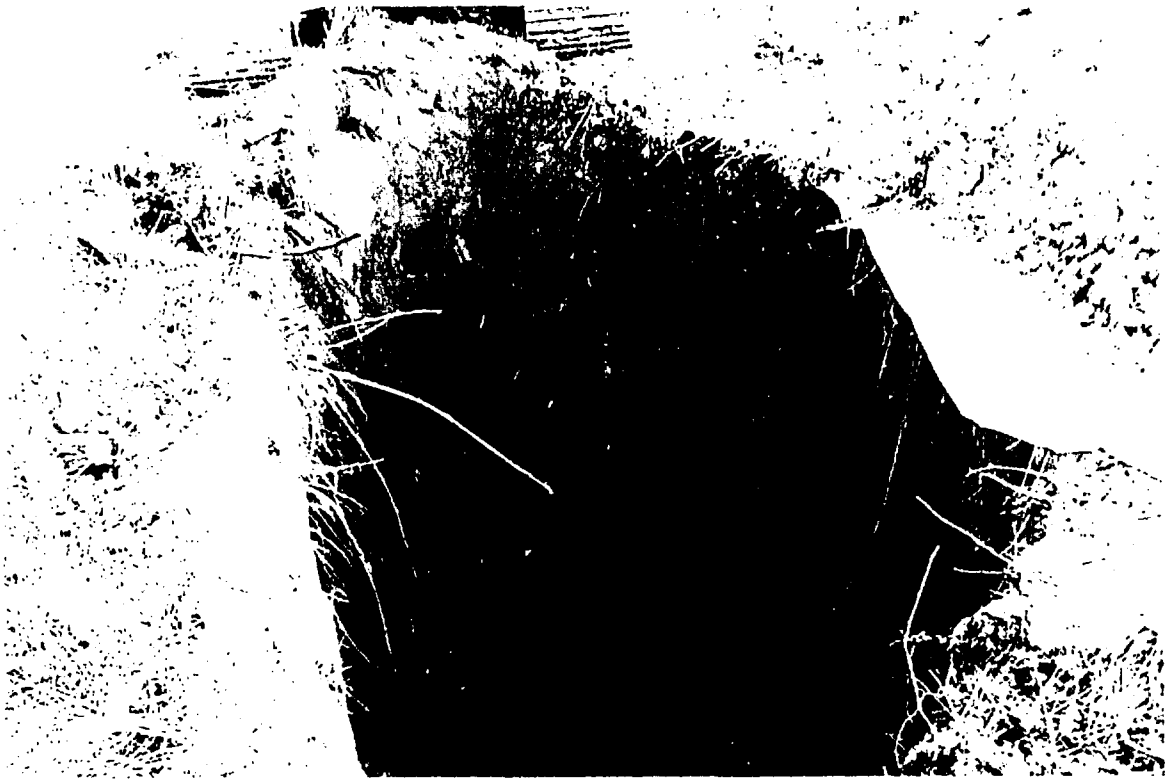
Site N boundary trenching, showing crushed drum in soil pile of north trench; Feb 2000

Site N boundary trenching, showing north end of north boundary trench; Feb 2000

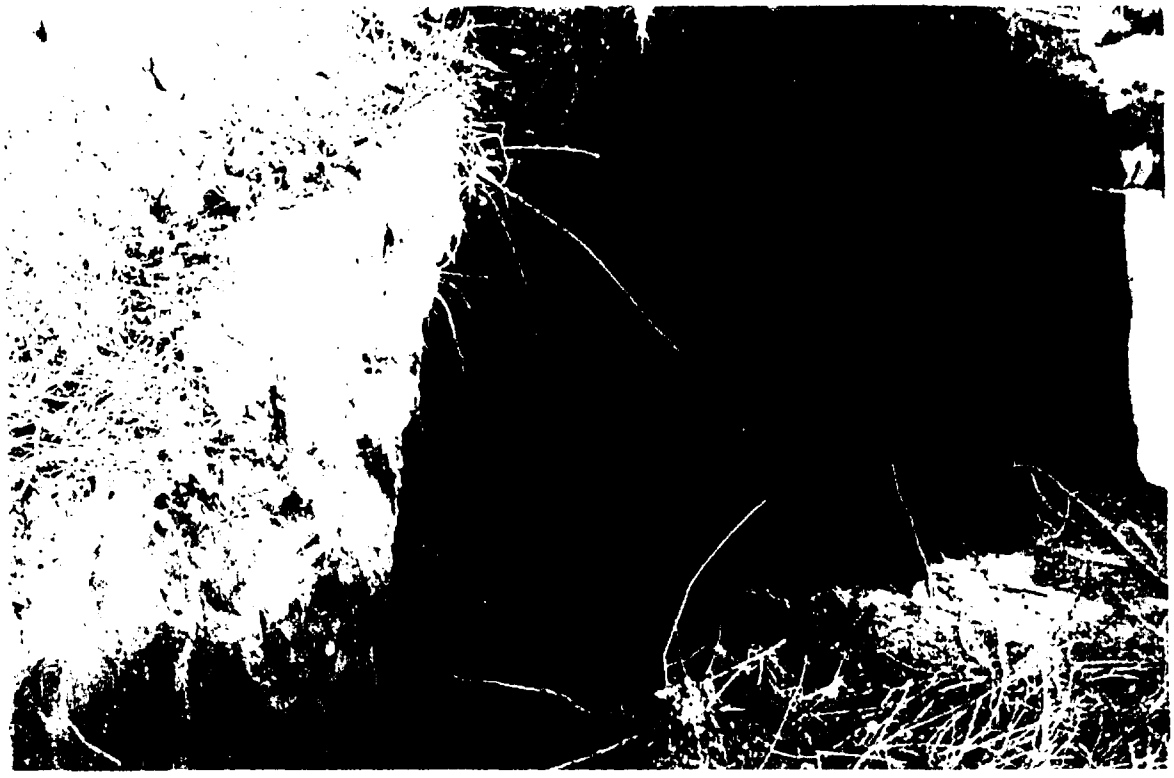
Site N boundary trenching, showing northern end of the north boundary trench; Feb 2000

Site N boundary trenching, showing north boundary trench facing north; Feb 2000

Site N boundary trenching, showing north boundary trench facing north; Feb 2000



Site N boundary trenching, showing west boundary trench facing east; Feb 2000



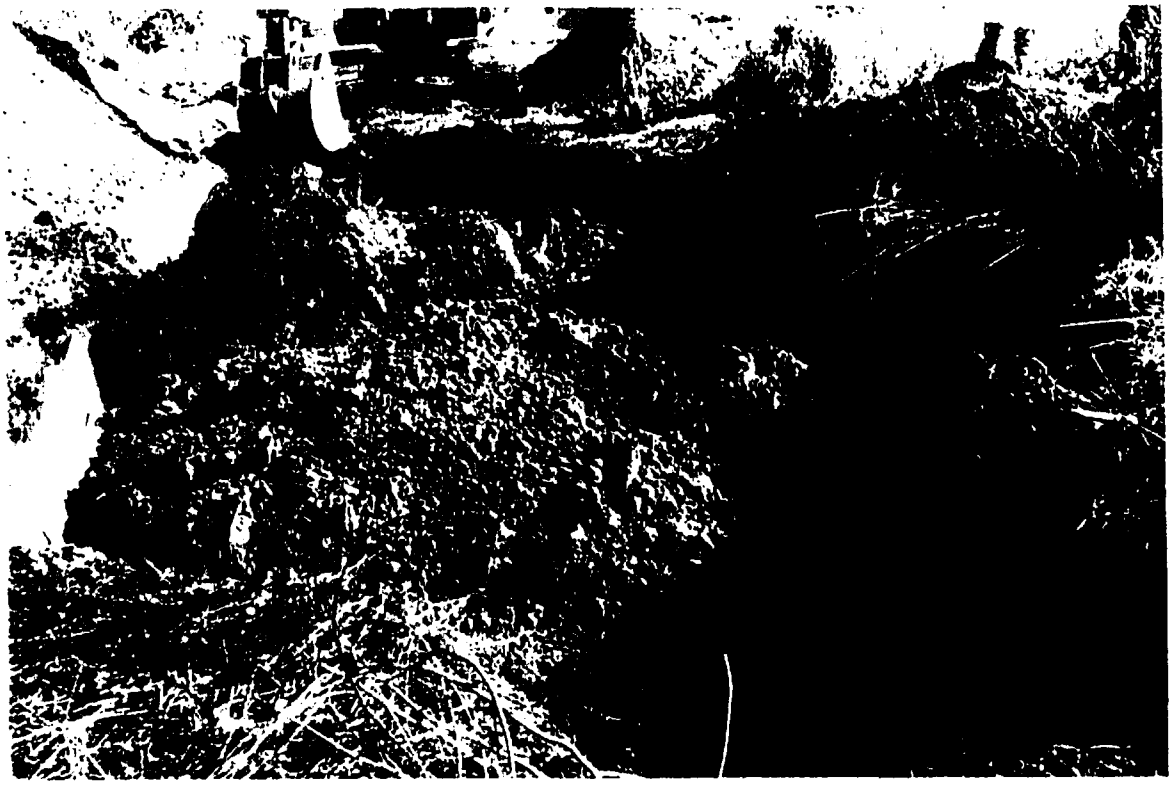
Site N boundary trenching, showing east wall of west boundary trench; Feb 2000

Site N boundary trenching, showing northern wall of west boundary trench; Feb 2000

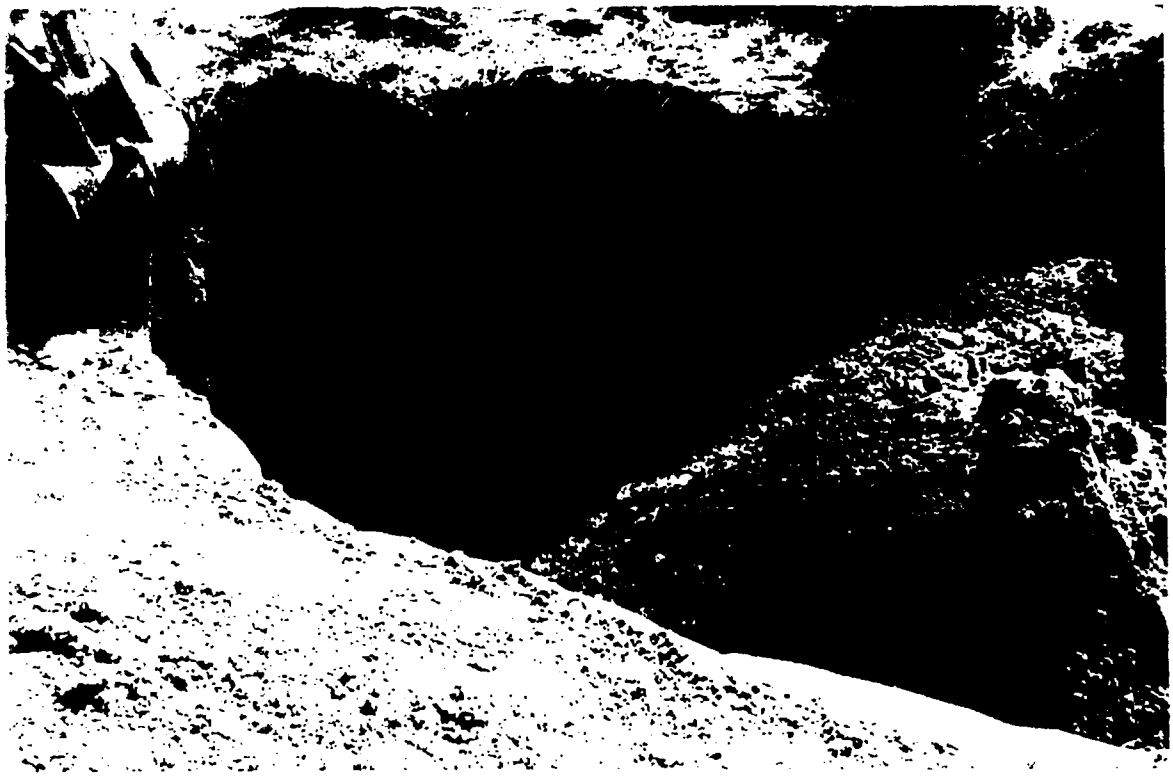
Site N boundary trenching, showing groundwater in west boundary trench; Feb 2000

Site N boundary trenching, showing demarcation of fill and native soil in west boundary trench; Feb 2000

Site N boundary trenching, showing fill material and groundwater in north end of south boundary trench; Feb 2000



Site N boundary trenching, showing full length of south boundary trench; Feb 2000



Site N boundary trenching, showing east wall of south boundary trench with fill and groundwater; Feb 2000

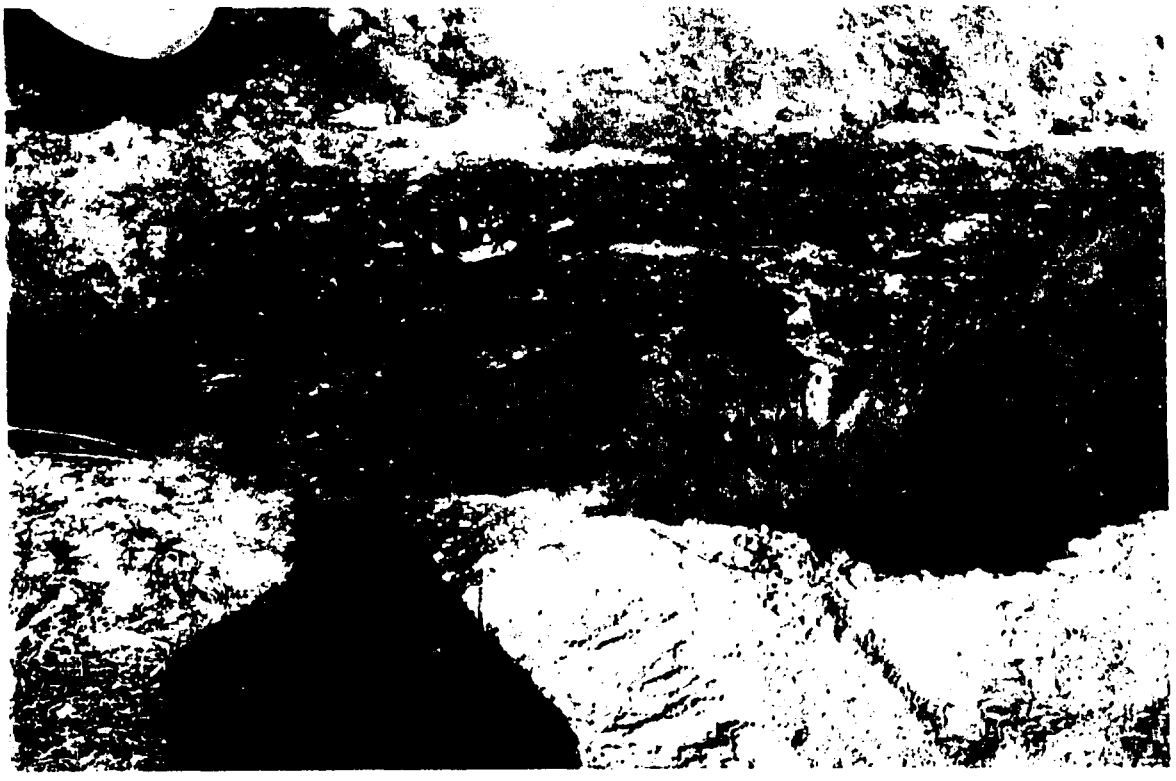
Site N boundary trenching, showing center of south boundary trench; Feb 2000

Site N boundary trenching, showing east soil pile of south boundary trench; Feb 2000

Site N boundary trenching, showing bottom of east boundary trench with saturated soil; Feb 2000

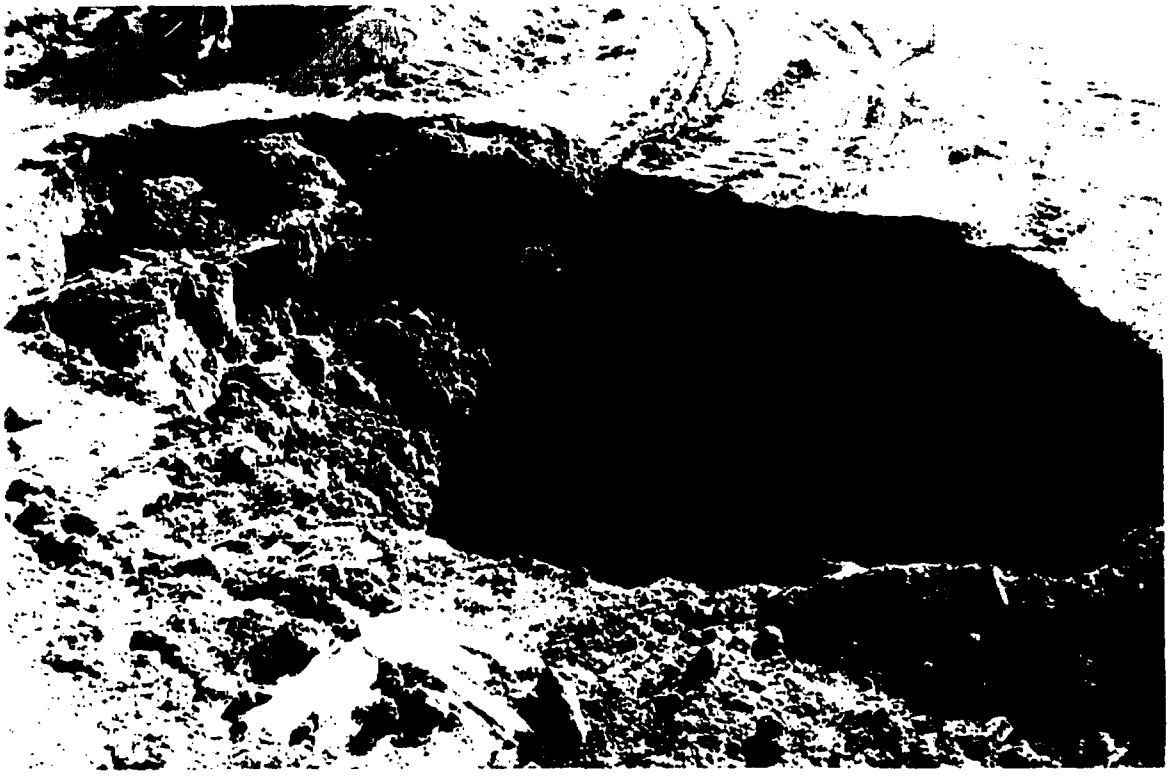
Site N boundary trenching, showing bottom of east boundary trench; Feb 2000

Site N boundary trenching, showing bottom of east boundary trench; Feb 2000



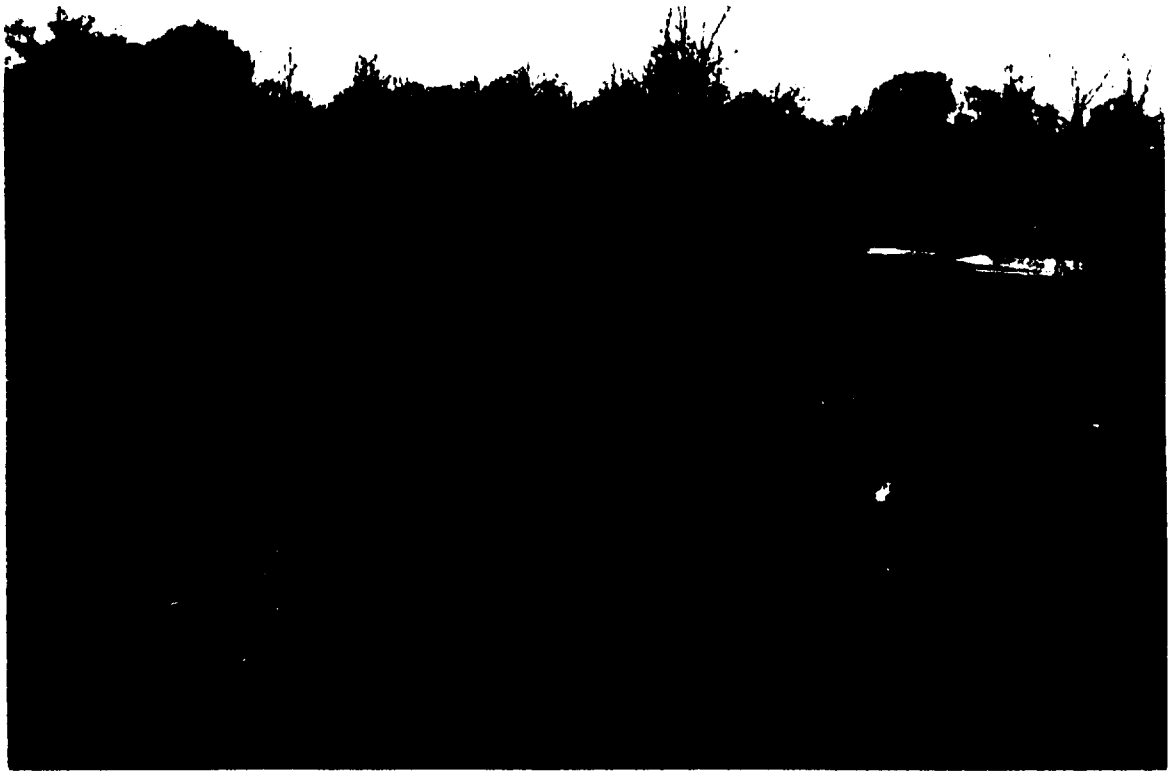
Site N boundary trenching, showing demarcation between fill material and native soil in east boundary trench; Feb 2000

Site N boundary trenching, showing soil pile of east boundary trench; Feb 2000



Site N boundary trenching, showing full view of east boundary trench; Feb 2000

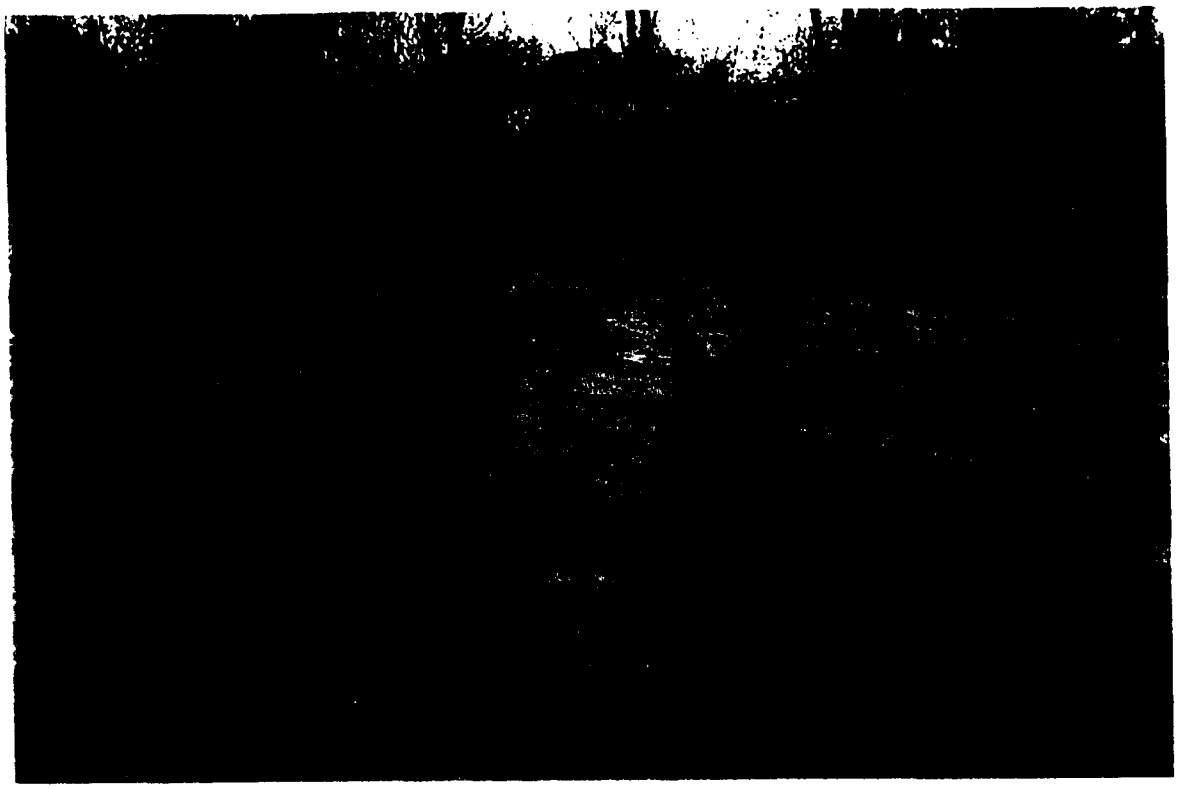
Site N boundary trenching, showing south wall of east boundary trench; Feb 2000



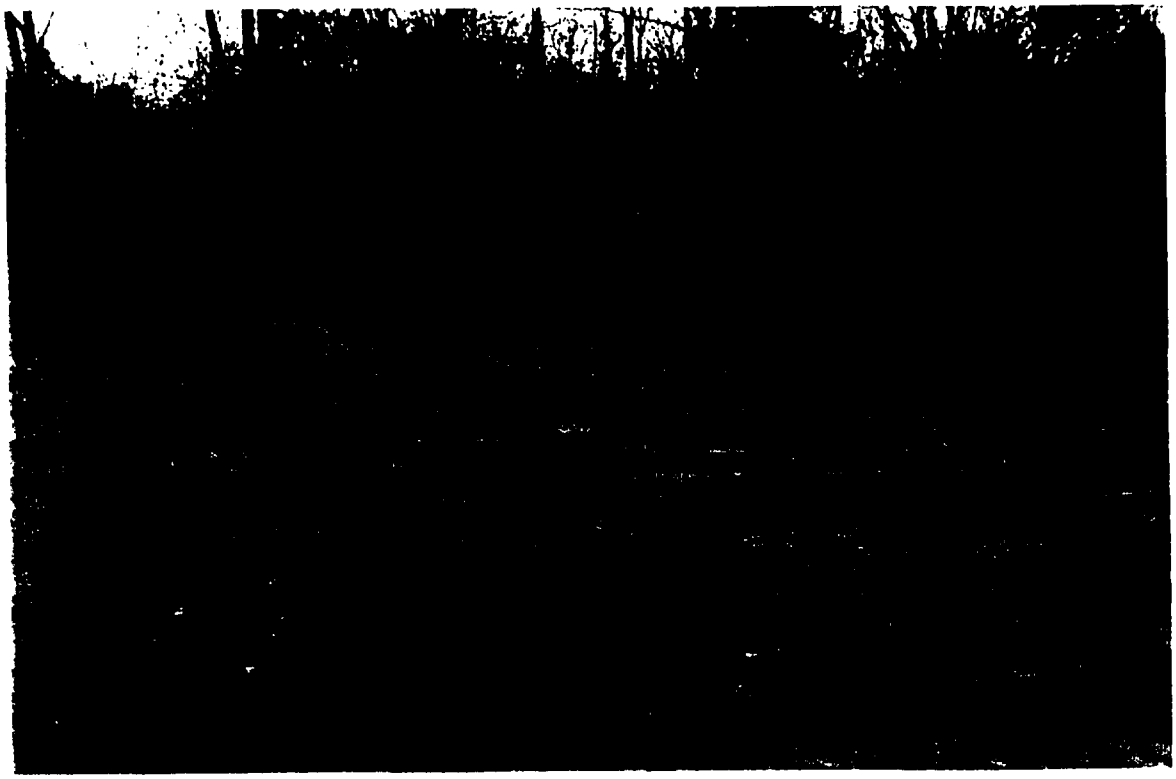
Site N boundary trenching, showing restored east boundary trench; Mar 2000

Site N boundary trenching, showing restored north boundary trench; Mar 2000

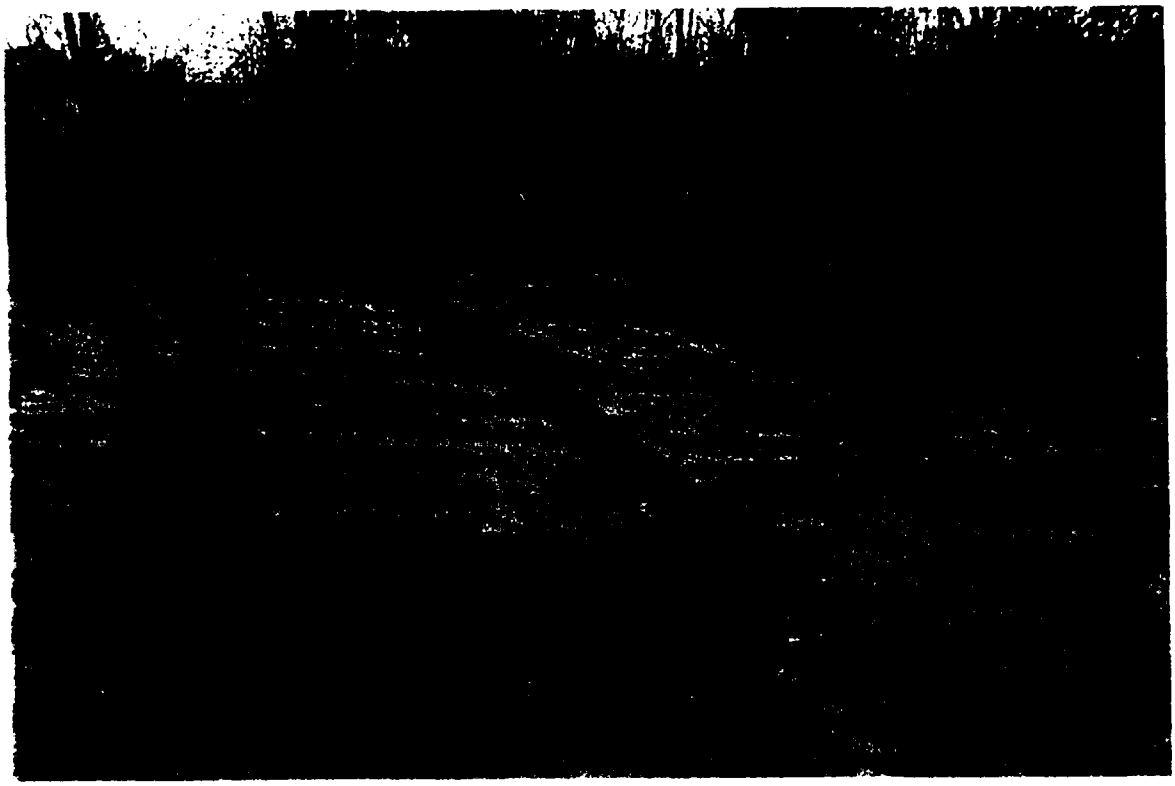
Site N boundary trenching, showing restored north boundary trench; Mar 2000



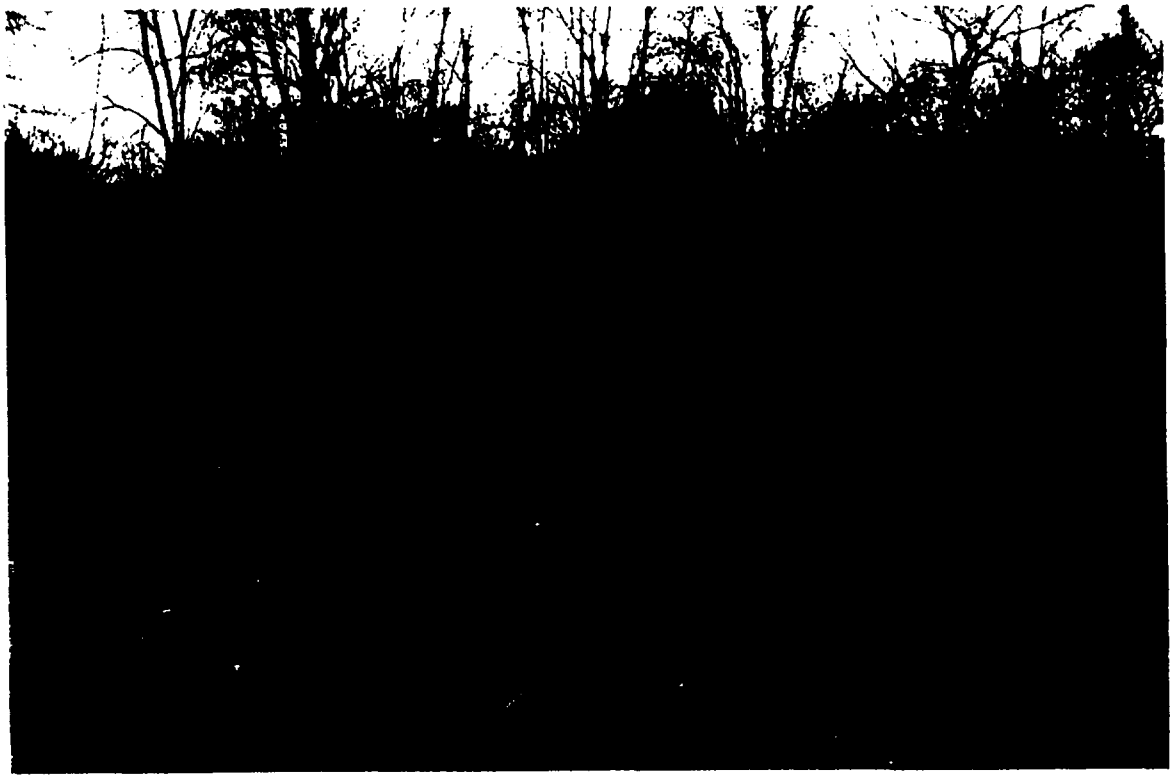
Site N boundary trenching, showing restored west boundary trench; Mar 2000



Site N boundary trenching, showing restored south boundary trench; Mar 2000



Site N boundary trenching, showing restored south boundary trench; Mar 2000



Site N boundary trenching, showing restored south boundary trench; Mar 2000

3.2. Soil Gas Survey

3.2.1. Rationale/Design

A soil gas survey was conducted at Sites G, H, I, L, and N using a shallow soil probe (five feet) and on-site analysis of collected vapors for volatile organic compounds (VOCs). Soil gas samples were collected at an approximate frequency of one sample per acre. Each sample was collected at the approximate center point of each grid cell using the following grid spacings:

Site	Grid Size	Grid Spacing	Number of Samples
G	400' x 600'	200' x 200'	6
H	400' x 800'	200' x 200'	8
I	400' x 1,200'	200' x 200'	12
L	200' x 200'	200' x 200'	1
N	300' x 300'	200' x 200'	2
Total Number of Samples			29

When detectable concentrations of VOCs were found in the fill area soil gas samples, the survey was extended beyond the grid boundaries. A total of 36 additional soil gas samples was collected perpendicular to the fill area grid cells (see table below). Soil gas samples were collected at 100-foot intervals (0, 100, and 200 feet from the edge of the grid cell) along four 200-foot-long transects; one transect perpendicular to each side of the grid cell. Soil gas samples were not collected on transects in cases where physical or legal access was not feasible. Where soil gas surveys extended into areas for which there were no property access agreements, soil gas samples was suspended until access was obtained.

Site	Number of Transects	Number of Samples
G	2	6
H	4	10
I	3	10
L	4	10
N	0	0
Total Number of Samples		36

Sampling locations were selected in the field with the concurrence of USEPA Region V or its designee. Soil gas sample locations are depicted in Figures 6 through 10 for the five sites.

3.2.2. Quality Assurance/Quality Control Samples

As this work was to field-screen soil vapors for total VOCs, quality assurance/quality control (QA/QC) samples such as duplicates were not collected. The field gas chromatograph (GC) was calibrated daily using the standard GC startup procedures for the membrane interface probe. A deviation was prepared to better explain the GC startup procedures and is included in Section 3.2.4.1.

3.2.3. Field Procedures

Prior to performing field work, a Preparatory Inspection Meeting attended by a representative of each of the interested parties was held (Section 3.2.4.2). A direct-push technology was used to advance a membrane interface probe (MIP) to five feet below existing grade. The MIP is a three-foot-long steel tool equipped with a point capable of penetrating relatively soft subsurface materials. Enclosed within the steel tubing are a polymer membrane, carrier gas tubes, and electrical wiring cables. The membrane is heated to 120 degrees Centigrade, allowing the migration of soil gases across the membrane and into the carrier gas chamber. The carrier gas captures the soil gases and feeds the sample directly to the GC. The GC then analyzes the sample and provides a report of total VOC concentrations. The output of the GC is in graphical form, recording the responses of the flame ionization detector (FID) and the electron capture detector (ECD) in unitless numbers versus depth. Each detector response is relative to a baseline, or background, response. Detector deflection above the baseline is considered to be a detection of VOCs. The GC with MIP has the capacity to detect VOCs in the low ppb range. Soil gas probing holes were sealed with granular bentonite following completion of sampling and analysis.

3.2.4. Documentation

Deviation to better explain the GC startup procedure is in Section 3.2.4.1. Field logs generated are included in Record Book No. 3 (Appendix D). Figures 6 through 10 depict soil gas survey locations. A report of analysis for the soil gas survey is included in Section 3.2.4.3. Requirements of FSP Section 6.2 are included in Section 3.2.4.3 of this report.

Documentation for this task continues on the next page.

3.2.4.1. *Change Orders and Deviation/Clarification Log*

DEVIATION LOG

INDIVIDUAL REQUESTING DEVIATION / COMPANY: DE Haverdink / OBG + Geo DATE 01 NOV 99

HEALTH & SAFETY APPROVAL REQUIRED: YES: _____ NO: X

PROJECT NAME Solutia - Sauget Area 1 PROJECT LOCATION Sauget / Cahokia

WEATHER — PRECIPITATION — TEMPERATURE —

NUMBER OF HOURS WORKED — NUMBER OF EMPLOYEES —

1. CONTRACT ITEM BEING WORKED ON:
2. ITEM BEING DEVIATED (REF. APPROP. SEC. OF FSP/HASP):
3. REASON FOR DEVIATION:
4. DEVIATION OR FIELD CHANGE TO BE IMPLEMENTED:
5. EQUIPMENT:
6. DEVELOPMENTS WHICH MIGHT LEAD TO ISSUANCES OF A CHANGE ORDER OR BE THE BASIS OF A CLAIM (EQUIPMENT; TIME; MANPOWER; ETC.):
7. REMARKS:

(1) Soil gas survey

(2) FSP # 5.2, Appendix A to FSP

(3) SOPs in Appendix A do not correspond with actual GC start up procedures for the membrane interface probe (MIP); in general, Appendix A is for use with compound-specific analysis, not total VOC analysis; the attached procedures are to be used instead of Appendix A

(4) the attached procedures are to be used instead of Appendix A

(5) field GC for MIP

(6) None

(7) None

DE Haverdink / DE Haverdink
PRINTED NAME / SIGNATURE OF PREPARER

Kimberly Perry / Kimberly Perry / 11/1/99
PRINTED NAME / SIGNATURE OF SOLUTIA REP / DATE

01 NOV 99
DATE

PRINTED NAME / SIGNATURE OF USEPA REP / DATE

IF ADDITIONAL SPACE IS REQUIRED,

C:\Sauget\OBG Forms\DEVLOG.WPD

GAS CHROMATOGRAPH (GC) STARTUP PROCEDURES FOR MEMBRANE INTERFACE PROBE (MIP)

1. Confirm gas flow of hydrogen, nitrogen, and air.
2. Power on to GC and stabilize detectors.
3. Monitor detector signal.
4. Establish proper signal / attenuation range on GC.
5. Stabilize MIP heater.
6. Introduce butane samples for 5 seconds.
7. Observe flow times to detectors and record.
8. Confirm signal output.
9. Set up on location and initiate sampling.

3.2.4.2. *Preparatory Inspection Meeting Form*

w/ Werton

PREPARATORY INSPECTION MEETING

Conducted by/Company: Tim Tedesco / O'Brien-n-Gere **Date:** 29 Oct 99

Project Name: Solutia Sugar Creek **Task:** Soil Gas Survey

1. Scheduled Work:

2. Equipment, Procedures, Personnel:

3. Ref. To App. Sec. of FSP/HASP:

4. Issues that could arise and how to resolve:

5. Solutia comments:

6. EPA comments:

1) Direct push soil probe to approx. 5 feet @ locations shown on figures 5&6 in the FSP. A total of 29 samples will be collected & analyzed w/ a field GC for total VOC concentration. Probing holes will be sealed w/ grout following completion of sampling & analysis.

2) Procedure for advancing probe to 5 feet will be direct push until refusal is encountered → these locations may require drilling to required depth & inserting probe. Locations will be in & out of the ROW areas. Field GC will be set & calibrated twice daily. Personnel include Innovative Probing & [I] OBG personnel.

3) Sect. 5.2 of the FSP & Sect. 2.2 of the HASP. Mod Dist

4) Access to all of site I will require orchestrated effort, direct p[ush] of probes may not be feasible & replaced w/ drilling, detectable concentrations of VOC's will be addressed by expanded the 29 samples to potentially 60 which will require buying additional grids & possibly obtaining additional access agreements.

ATTENDANCE:

EMPLOYEE NAME (print)	EMPLOYEE SIGNATURE	COMPANY
~~PE Haverdink~~		OBG
~~Tony DeCraft~~		IPS
~~E K~~		RSW
~~Kimberly Perry~~		Solutia
~~Ken LAFFERTY~~		MAVERICK
~~Adam Clark~~		OBG

IF ADDITONAL SPACE IS REQUIRED, RECORD ON REVERSE SIDE

Tim Tedesco / Tty P.U.

PRINTED NAME/ SIGNATURE OF PREPARE

29 Oct 99

DATE

3.2.4.3. Soil Gas Survey Report

O'BRIEN & GERE ENGINEERS, INC.
5000 CEDAR PLAZA PARKWAY
SUITE 211
ST. LOUIS, MO 63128

SITE:
SOLUTIA
SAUGET, IL

PROJECT: Solutia
Sauget, IL

CLIENT: O'Brien & Gere Engineers, Inc.
5000 Cedar Plaza Parkway
Suite 211
St. Louis, MO 63128

SAMPLE DATES: November 1 thru December 21, 1999

REPORT DATE: December 30, 1999

REPORT NUMBER: 9912474

This report summarizes groundwater sampling activities at the above-referenced site. Groundwater samples were obtained by purging the well for 2 hours with a peristalic pump, then collecting the groundwater sample. A total of eighty-seven (87) groundwater samples were collected.

Additionally, this report summarizes membrane interface probing (MIP) activities at the above-referenced site. An MIP survey was conducted at several areas within and around the project site. The MIP survey consisted of continuously measuring conductivity, penetration rate, organic vapors, and temperature with various total depths.

Representatives of O'Brien & Gere Engineers were present to direct sampling activities and acquired samples for off-site laboratory analysis.

Upon reviewing the following results, please do not hesitate to call with any questions. Thank you for choosing Innovative Probing Solutions for your project.

MIP DATA

SOLUTIA
SAUGET, IL

AREA G

LOCATION	FID DEFLECTION	ECD DEFLECTION
SGG-01	98.0 +4	ND
SGG-02	ND	ND
SGG-03	ND	ND
SGG-04	ND	ND
SGG-05	33.0 +4	ND
SGG-06	ND	ND
SGGS-000	ND	ND
SGGS-100	ND	ND
SGGS-200	ND	ND
SGGW-000	ND	ND
SGGW-100	ND	ND
SGGW-200	ND	ND

AREA H

LOCATION	FID DEFLECTION	ECD DEFLECTION
SGH-01	93.0 +4	ND
SGH-02	38.0 +4	ND
SGH-03	ND	ND
SGH-04	ND	ND
SGH-05	ND	ND
SGH-06	4.5 +4	ND
SGH-07	ND	ND
SGH-08	28.0 +4	ND
SGHNE-000	5.0 +4	ND
SGHNE-100	ND	ND
SGHNE-160	ND	ND
SGHNW-000	148.0 +4	ND
SGHNW-100	ND	ND
SGHSW-000	ND	ND
SGHSW-100	ND	ND
SGHSW-200	ND	ND
SGHE-000	ND	ND
SGHE-100	ND	ND

AREA I

LOCATION	FID DEFLECTION	ECD DEFLECTION
SGI-01	ND	ND
SGI-02	1.0 +4	ND
SGI-03	8.0 +4	ND
SGI-04	ND	ND
SGI-05	ND	ND
SGI-06	ND	ND
SGI-07	8.0 +4	ND
SGI-08	ND	ND
SGI-09	98.0 +4	ND
SGI-10	58.0 +4	ND
SGI-11	9.8 +4	ND
SGI-12	3.0 +4	ND
SGIN-000	ND	ND
SGIN-100	ND	ND
SGIS-000	33.0 +4	ND
SGIS-100	23.0 +4	ND
SGIS-200	38.0 +4	ND
SGIS-300	19.0 +4	1.0 +4
SGIS-400	49.0 +4	ND
SGIE-000	ND	ND
SGIE-100	ND	ND
SGIE-200	ND	ND

AREA L

LOCATION	FID DEFLECTION	ECD DEFLECTION
SGL-01	30.5 +4	ND
SGLN-000	ND	ND
SGLN-100	1.0 +4	ND
SGLN-200	ND	ND
SGLS-000	ND	ND
SGLS-100	ND	ND
SGLS-200	ND	ND
SGLE-000	ND	ND
SGLE-100	148.0 +4	ND
SGLE-200	53.0 +4	ND
SGLW-000	ND	ND

AREA N

LOCATION	FID DEFLECTION	ECD DEFLECTION
SGN-01	ND	ND
SGN-02	ND	ND

FIELD LOG DATA
SAUGET
November - 1999

LOCATION	DATE	TIME
SGG-01	11/3/99	10:20
SGG-02	11/3/99	11:00
SGG-03	11/3/99	11:29
SGG-04	11/3/99	11:41
SGG-05	11/3/99	12:22
SGG-06	11/3/99	12:47
SGGS-000	11/9/99	15:21
SGGS-100	11/9/99	15:36
SGGS-200	11/9/99	15:50
SGGW-000	11/9/99	12:14
SGGW-100	11/9/99	14:04
SGGW-200	11/9/99	14:18
SGN-01	11/3/99	15:23
SGN-02	11/3/99	16:00
SGH-01	11/2/99	11:53
SGH-02	11/2/99	12:16
SGH-03	11/2/99	12:41
SGH-04	11/2/99	14:06
SGH-05	11/2/99	14:32
SGH-06	11/2/99	14:57
SGH-07	11/2/99	15:19
SGH-08	11/2/99	15:37
SGH NW-000	11/4/99	12:07
SGH NW-100	11/4/99	12:24
SGH SW-000	11/5/99	14:54
SGH SW-100	11/5/99	15:25
SGH SW-200	11/5/99	15:40
SGI-01	11/1/99	17:15
SGI-02	11/2/99	9:12
SGI-03	11/2/99	10:20
SGI-04	11/2/99	10:39
SGI-05	11/2/99	10:56
SGI-06	11/2/99	11:13
SGI-07	11/4/99	8:54

FIELD LOG DATA
SAUGET
November - 1999

SGI-08	11/4/99	10:20
SGI-09	11/4/99	10:41
SGI-10	11/4/99	9:25
SGI-11	11/4/99	9:50
SGI-12	11/4/99	11:14
SGI S-000	11/5/99	16:16
SGI S-100	11/5/99	16:40
SGI S-200	11/5/99	17:08
SGI S-300	11/9/99	9:52
SGI S-400	11/9/99	10:16
SGI N-000	11/9/99	10:44
SGI N-100	11/9/99	11:19
SGL-01	11/2/99	16:26
SGL E-000	11/4/99	14:39
SGL E-100	11/4/99	15:00
SGL E-200	11/4/99	15:24
SGL S-000	11/4/99	15:48
SGL S-100	11/4/99	16:03
SGL S-200	11/4/99	16:15
SGL N-000	11/5/99	12:14
SGL N-100	11/5/99	12:30
SGL N-200	11/5/99	12:42
SGL W-000	11/5/99	11:48

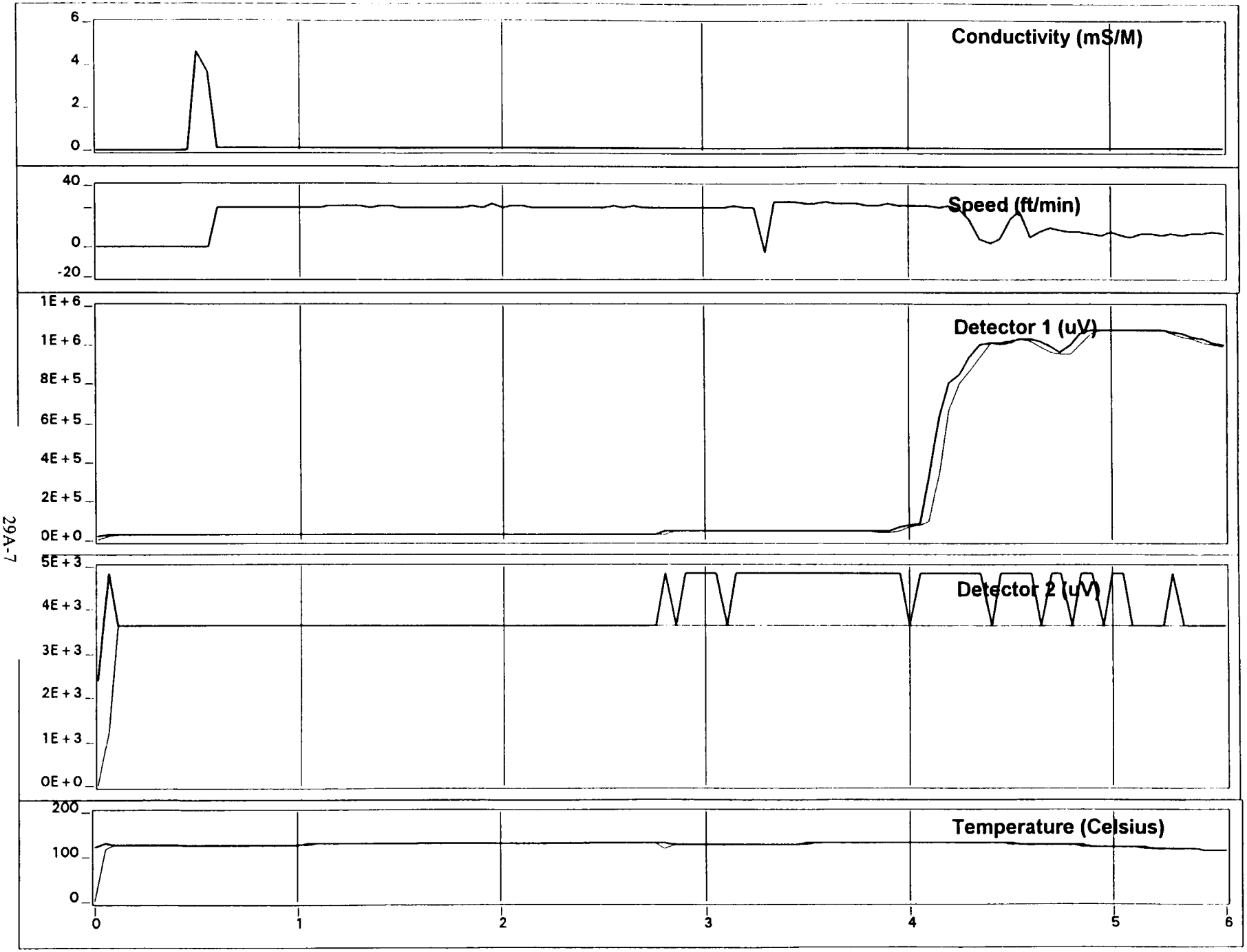
FIELD LOG DATA
SAUGET
December – 1999

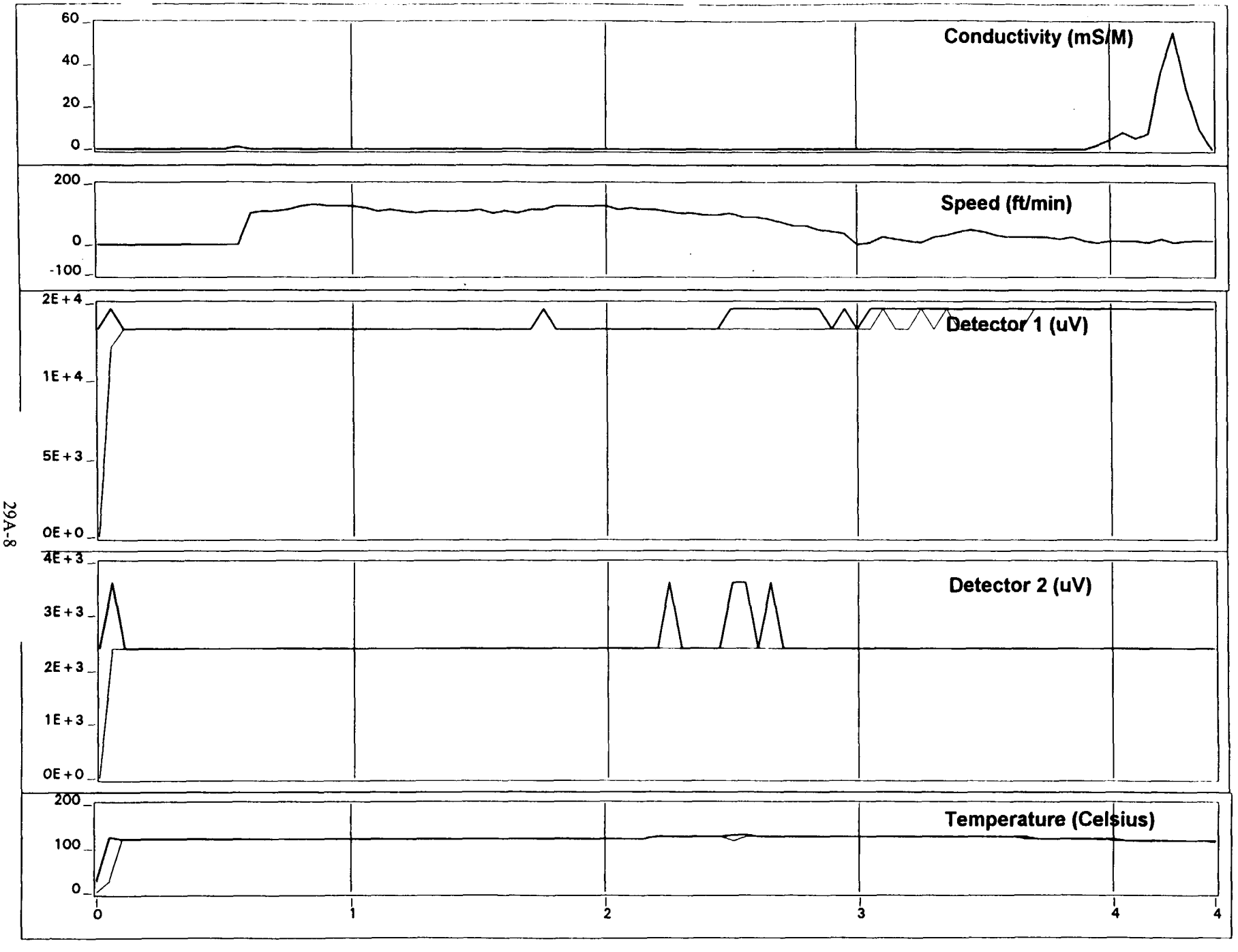
Location	Date	Time
SGH NE-000	12/20/99	11:39
SGH NE-100	12/20/99	11:57
SGH NE-160	12/20/99	12:13
SGH E-000	12/20/99	11:05
SGH E-100	12/20/99	11:22
SGI E-000	12/20/99	9:51
SGI E-100	12/20/99	2:37
SGI E-200	12/20/99	2:52

Chromatogram Information

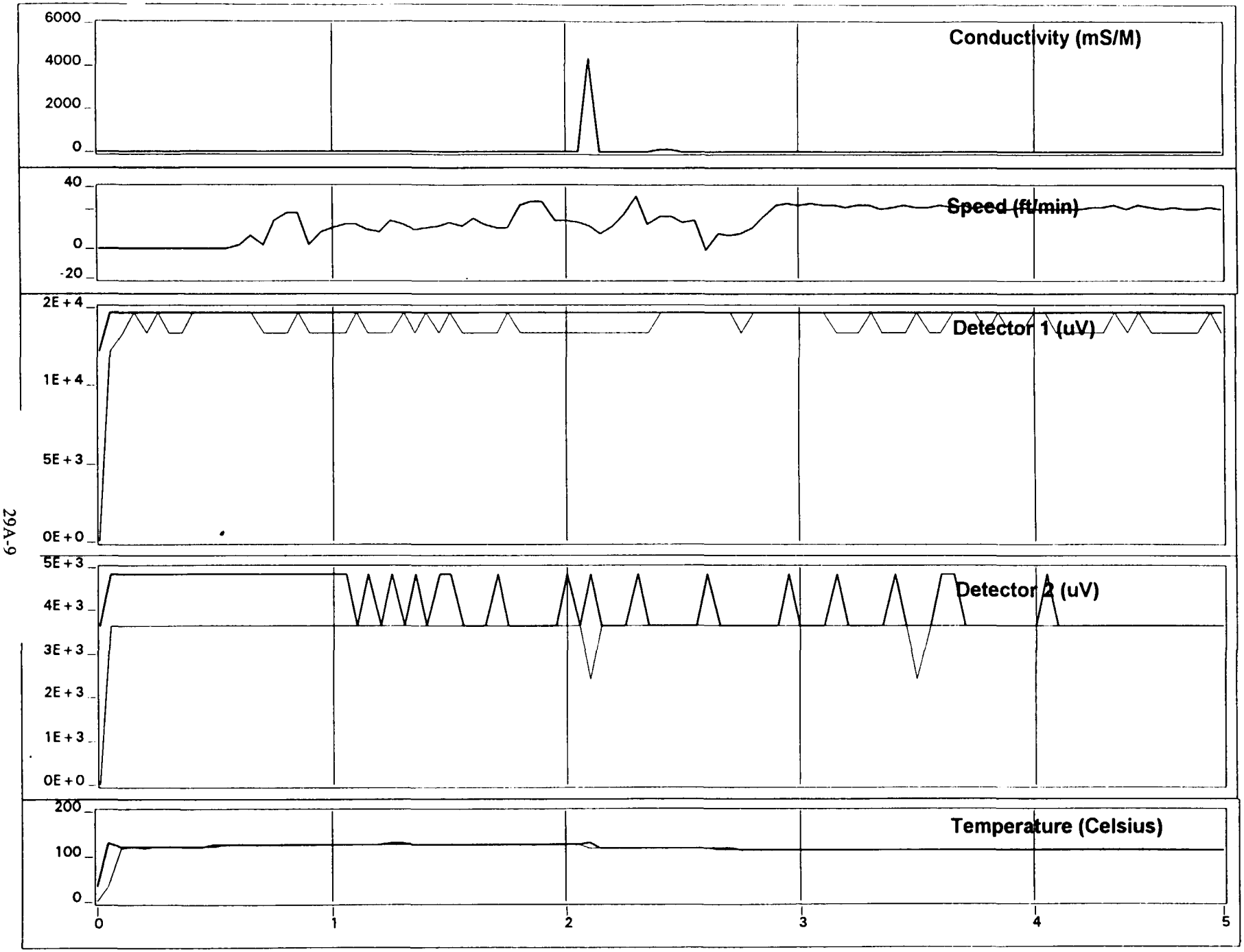
Sampler Name:	John Upcraft
Instrument Name:	Geoprobe MIP Utilizing HP 5890 II
Column:	No Column
Detector:	FID & ECD
Carrier Gas:	Pure Nitrogen
Flow Rate:	8 seconds from membrane to detectors
Back Flush Time:	N/A
Injection Volume:	N/A
Gain Setting:	High

Log: | A:)files\SGG01.DAT




Log: [A:\ ...files\SGG02.DAT
Conductivity (mS/M)
60
40
20
0
Speed (ft/min)
200
0
-100
Detector 1 (uV)
2E+4
1E+4
5E+3
0E+0
Detector 2 (uV)
4E+3
3E+3
2E+3
1E+3
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
4

Log: | A: gfiles\SGG03.DAT



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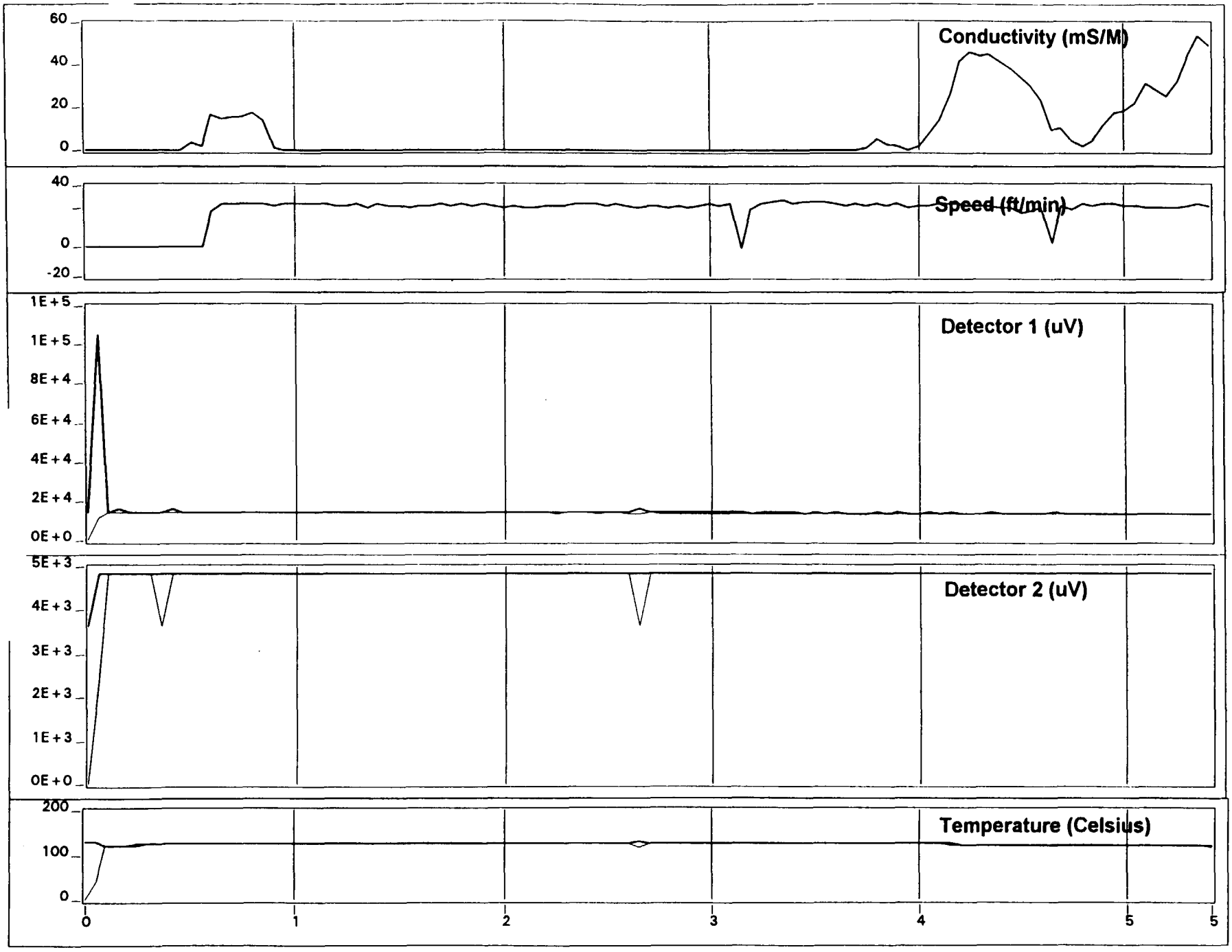

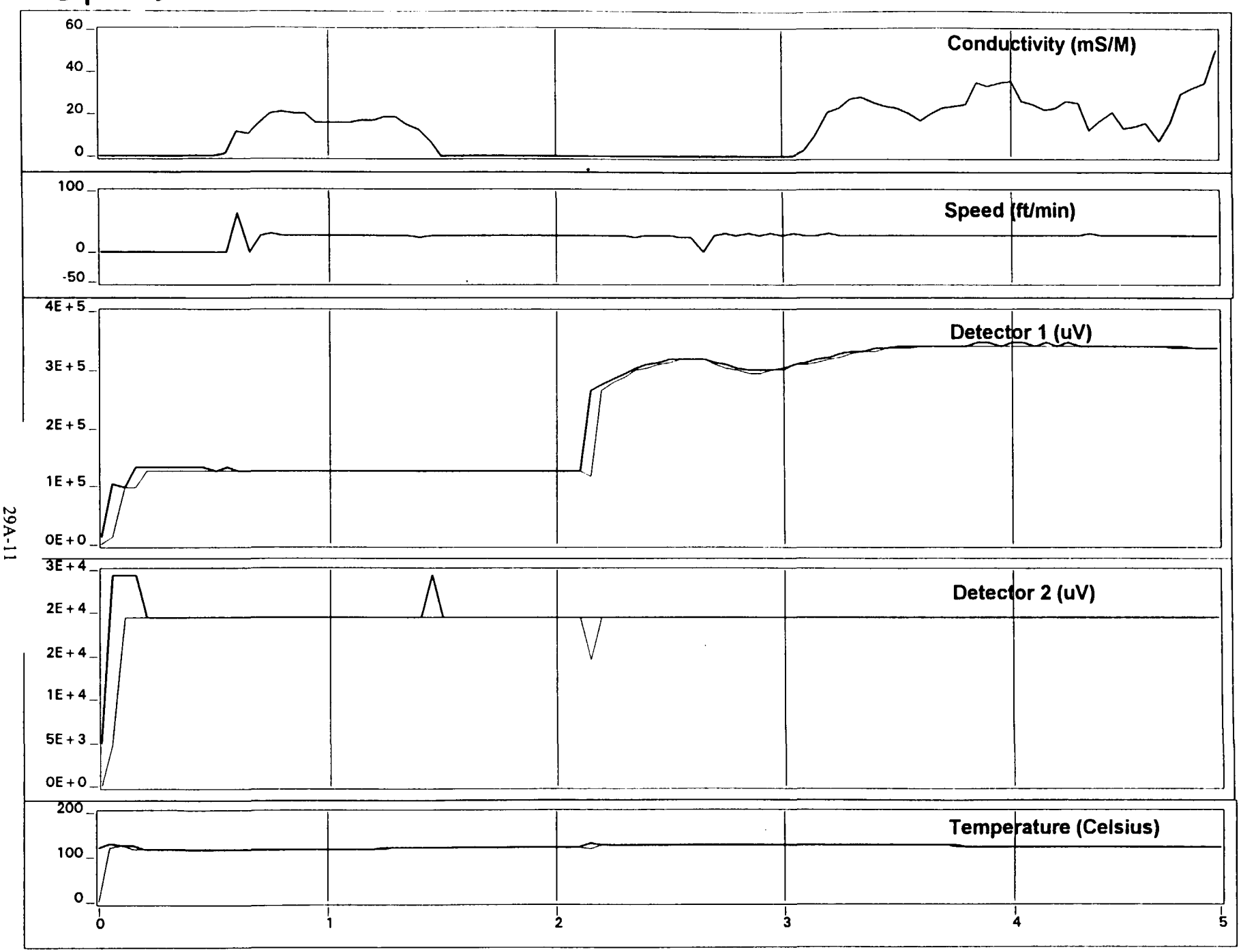
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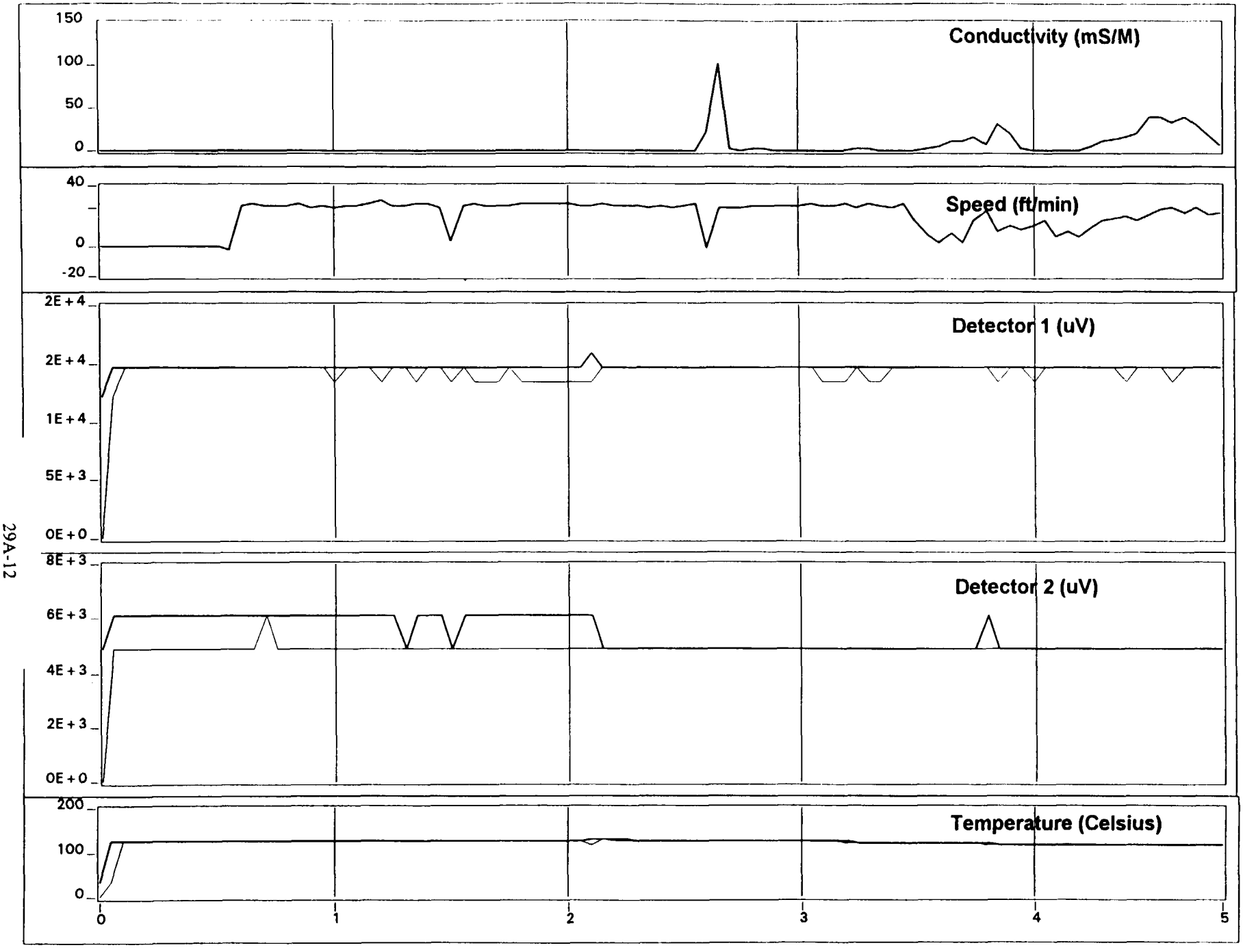
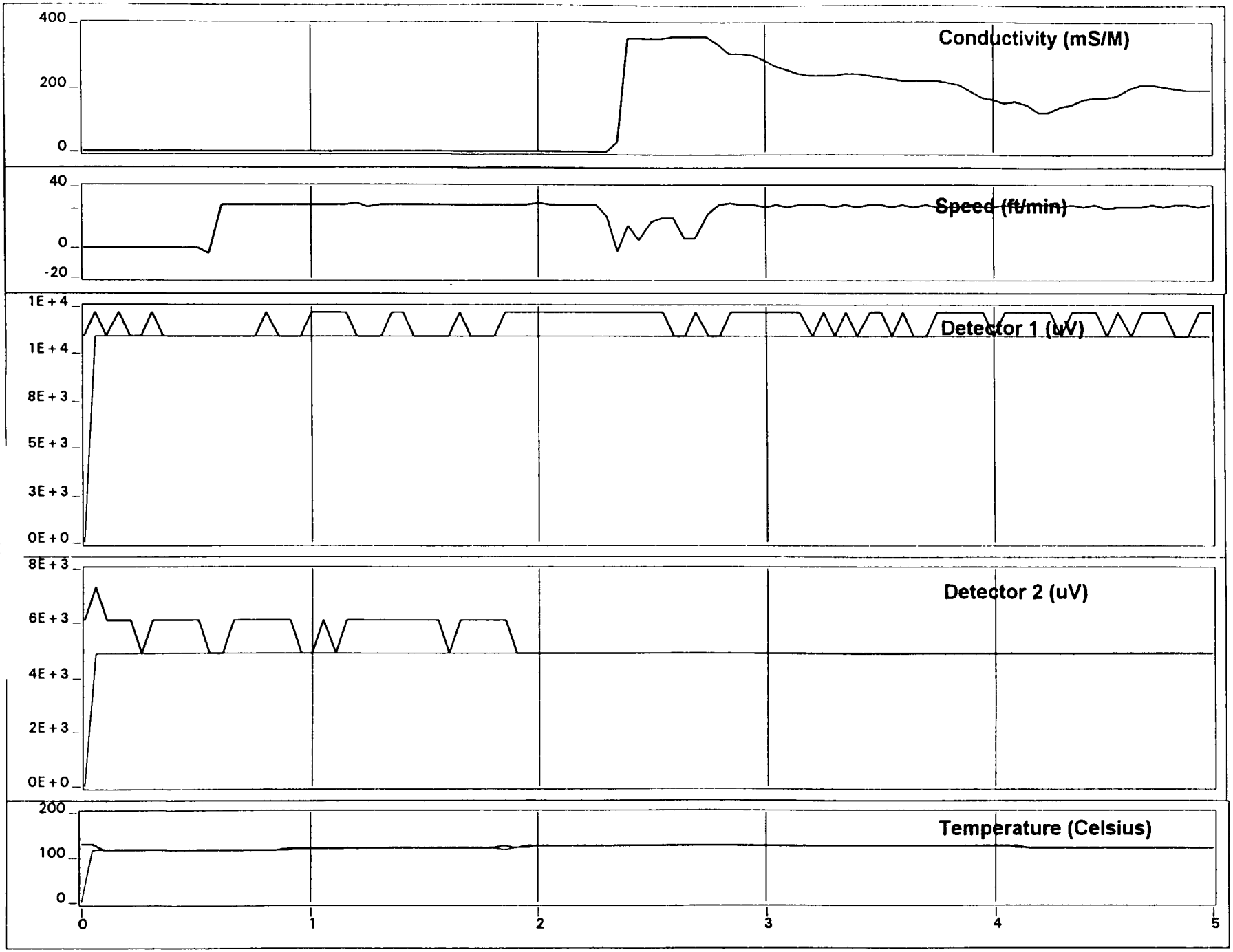
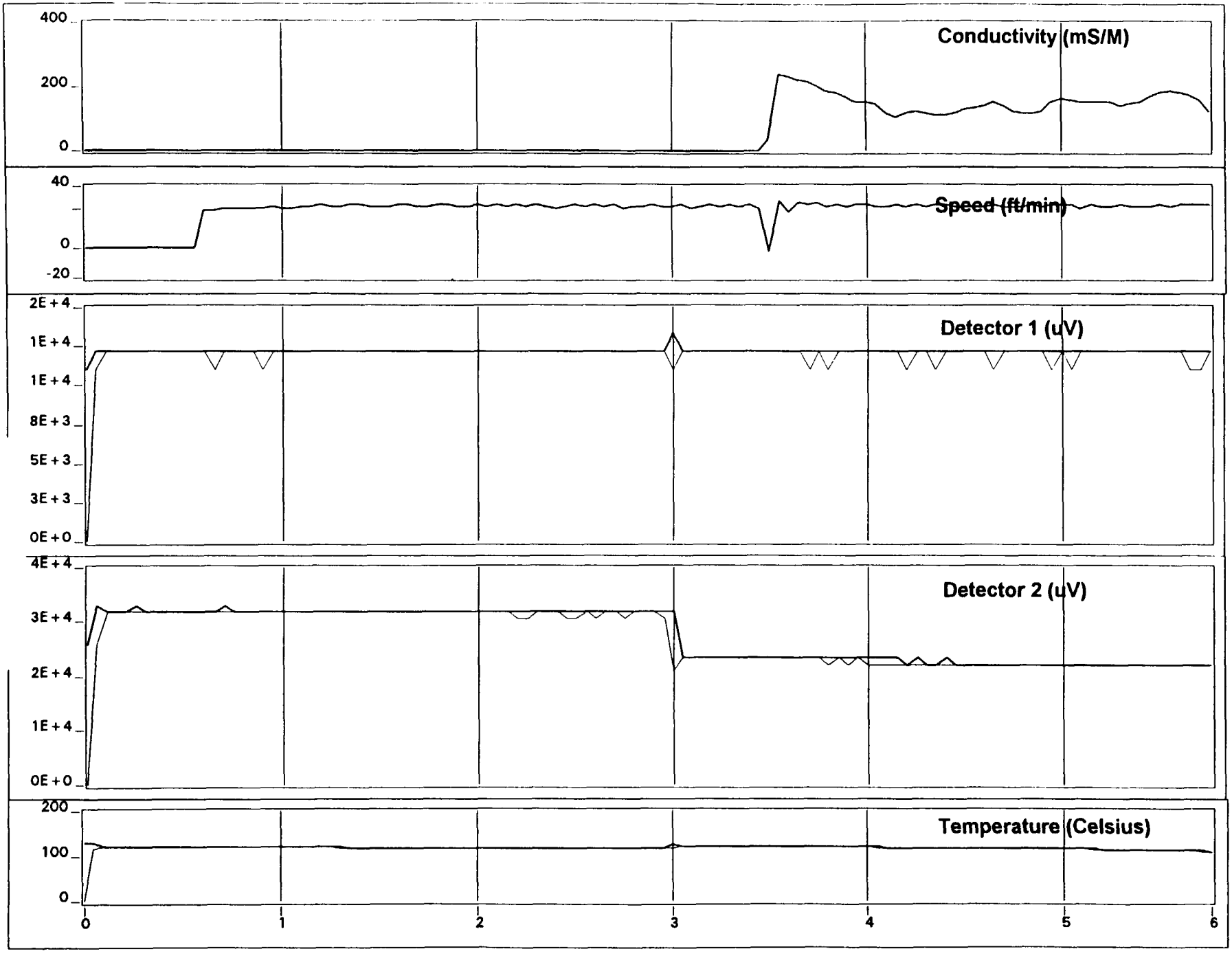
Conductivity (mS/M)
60
40
20
0
Speed (ft/min)
100
0
-50
Detector 1 (uV)
4E+5
3E+5
2E+5
1E+5
0E+0
Detector 2 (uV)
3E+4
2E+4
2E+4
1E+4
5E+3
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5

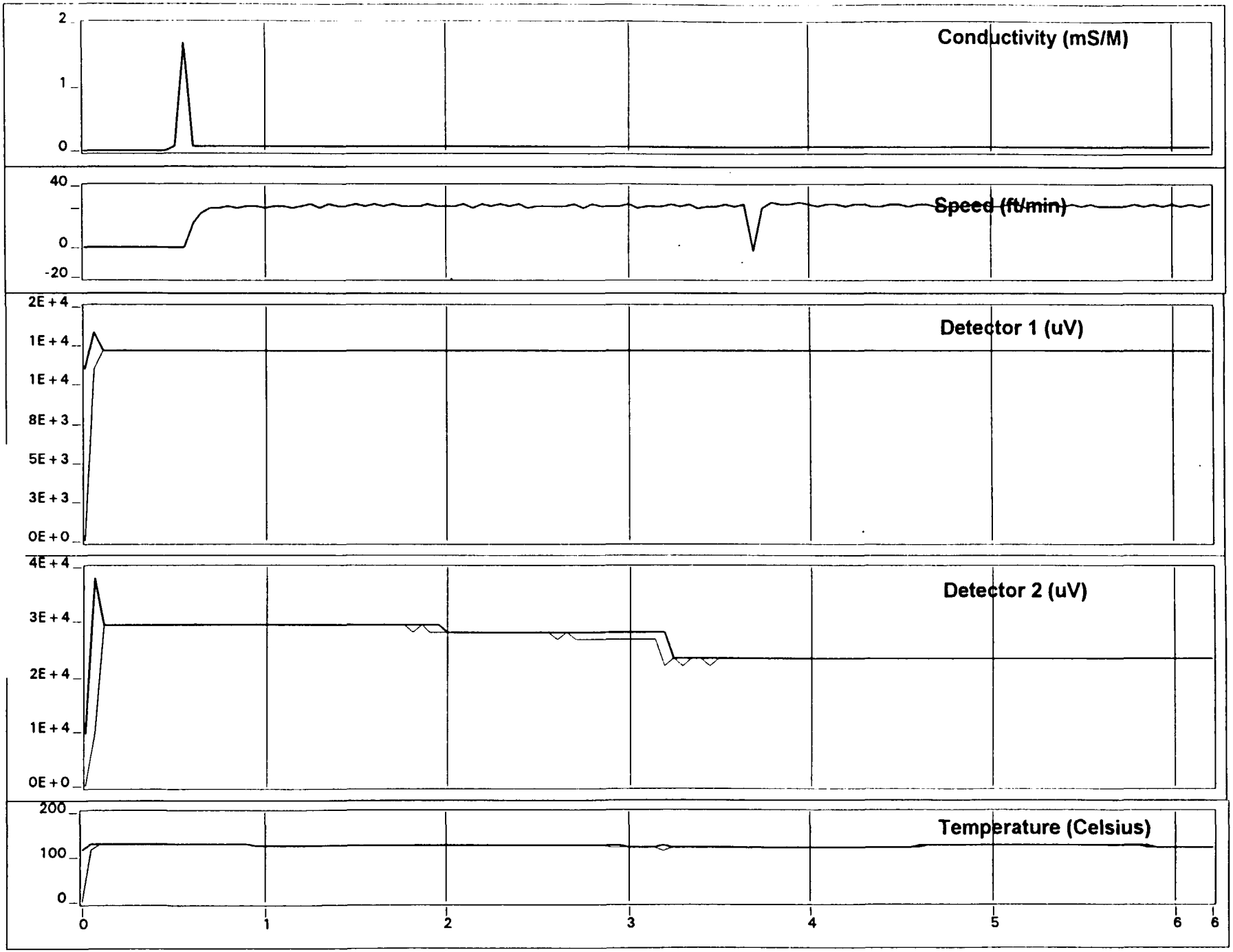
Log: | A: gfiles\SGG06.DAT




Log: A)GFILES\SGGS000.DAT
400
200
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
1E+4
1E+4
8E+3
5E+3
3E+3
0E+0
Detector 1 (uV)
8E+3
6E+3
4E+3
2E+3
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5

Log: | A:)GFILES\SGGS100.DAT

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Conductivity (mS/M)
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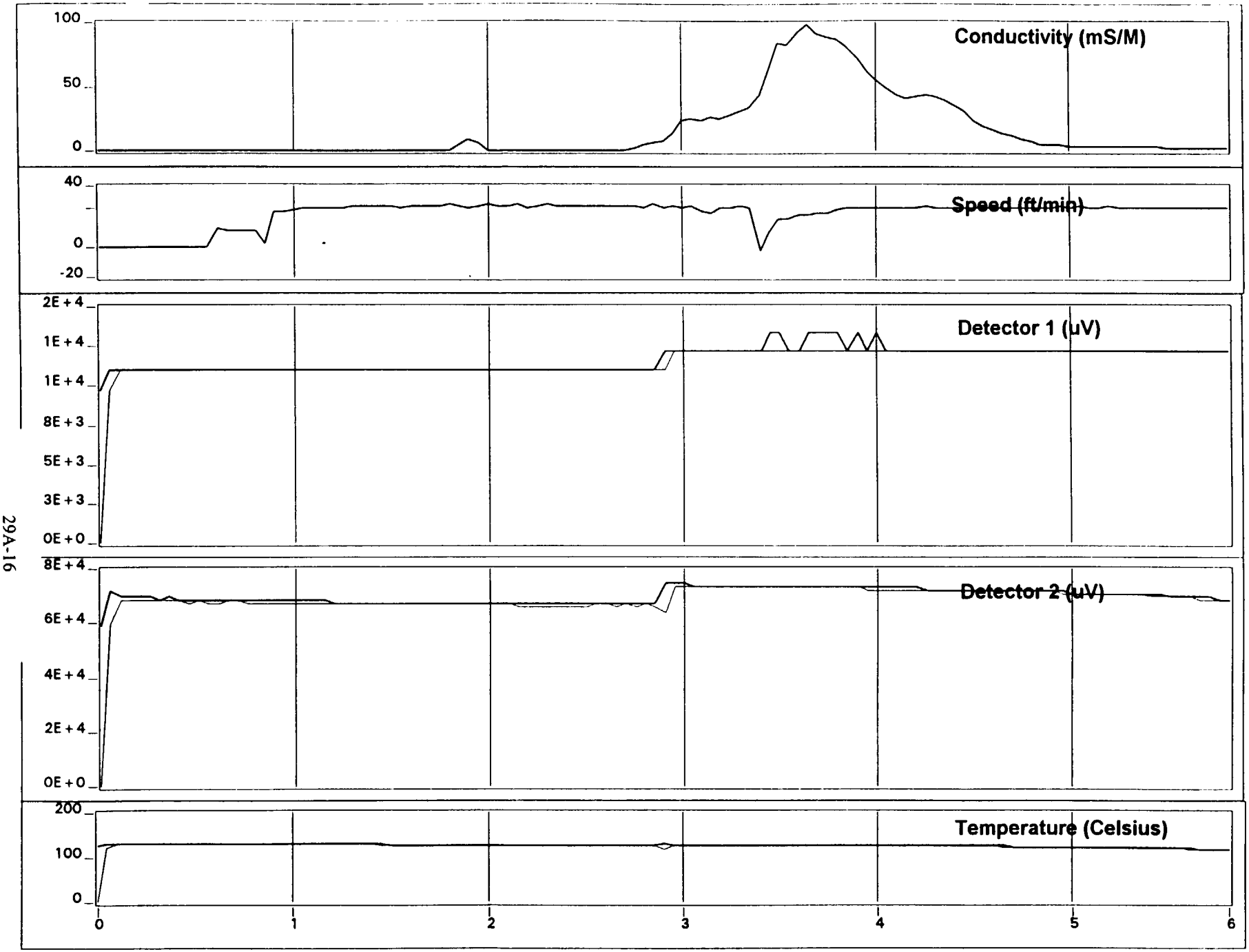
1
0
Speed (ft/min)
40
0
-20
Detector 1 (uV)
2E+4
1E+4
1E+4
8E+3
5E+3
3E+3
0E+0
Detector 2 (uV)
4E+4
3E+4
2E+4
1E+4
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6
6

Log: | A:')GFILES\SGGW000.DAT



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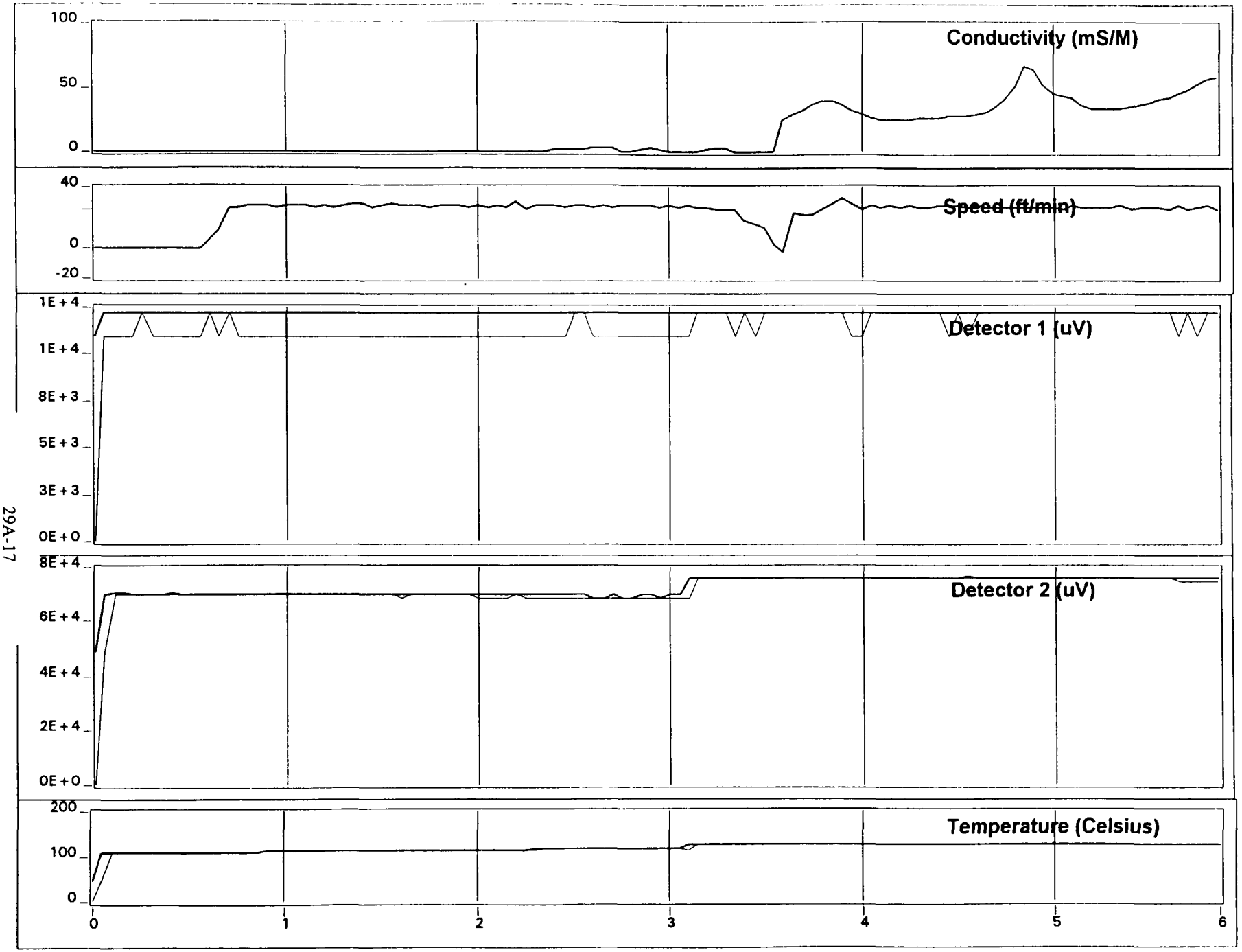
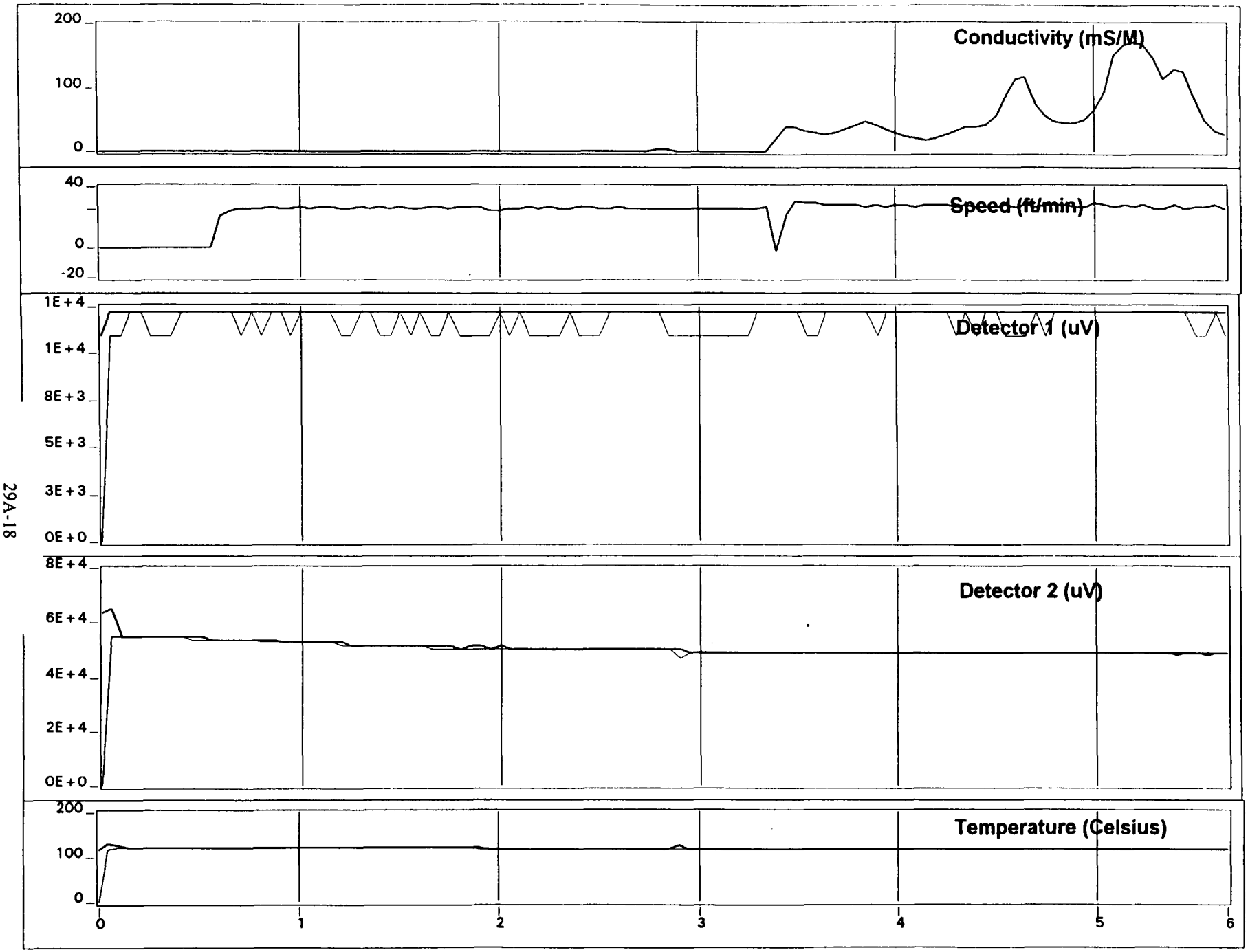
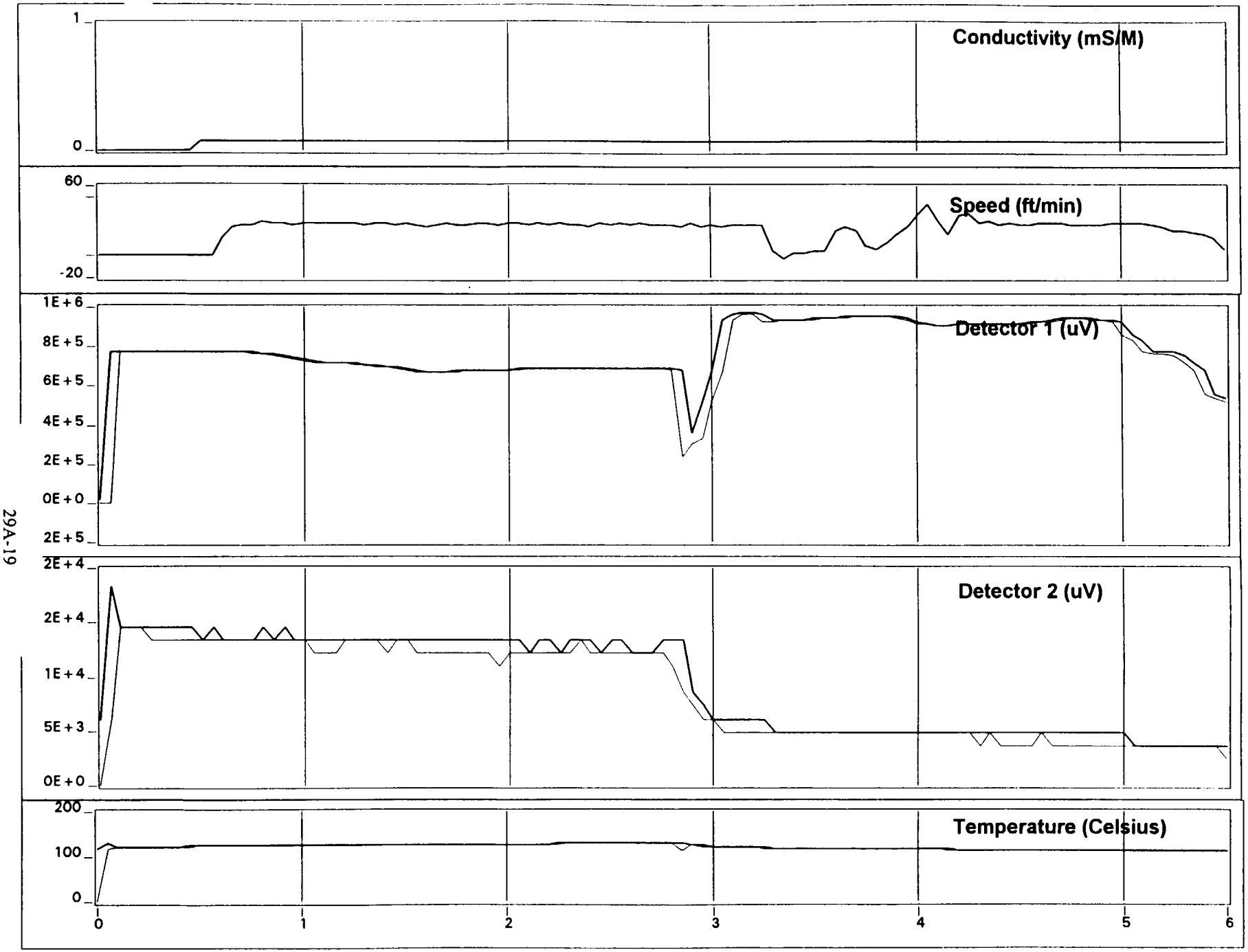
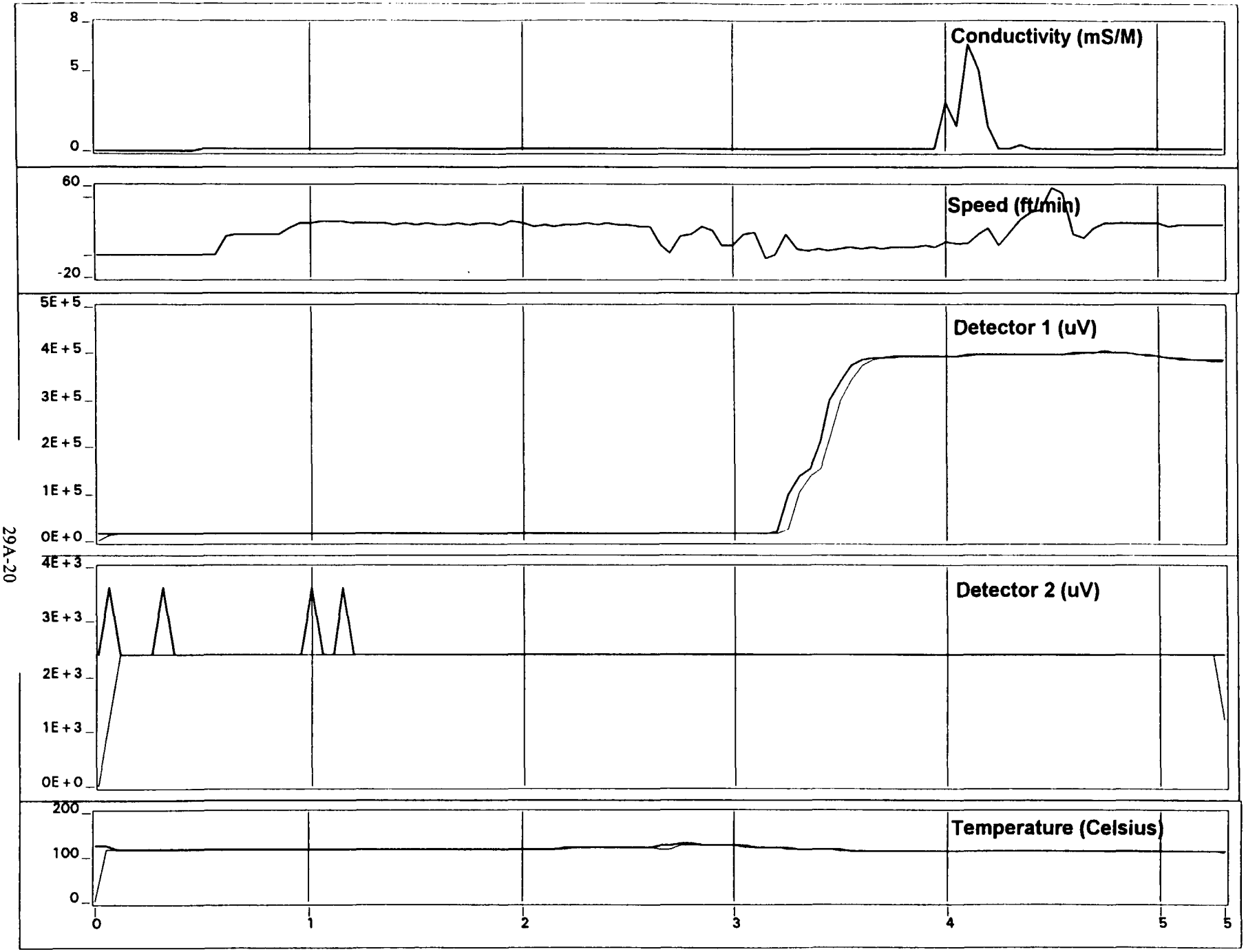



Log: A:' GFILES\SGGW200.DAT
200
100
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
1E+4
1E+4
8E+3
5E+3
3E+3
0E+0
Detector 1 (uV)
8E+4
6E+4
4E+4
2E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5
6

Log: |A: GFILES\SGH01.DAT



Log: | A:')GFILES\SGH02.DAT



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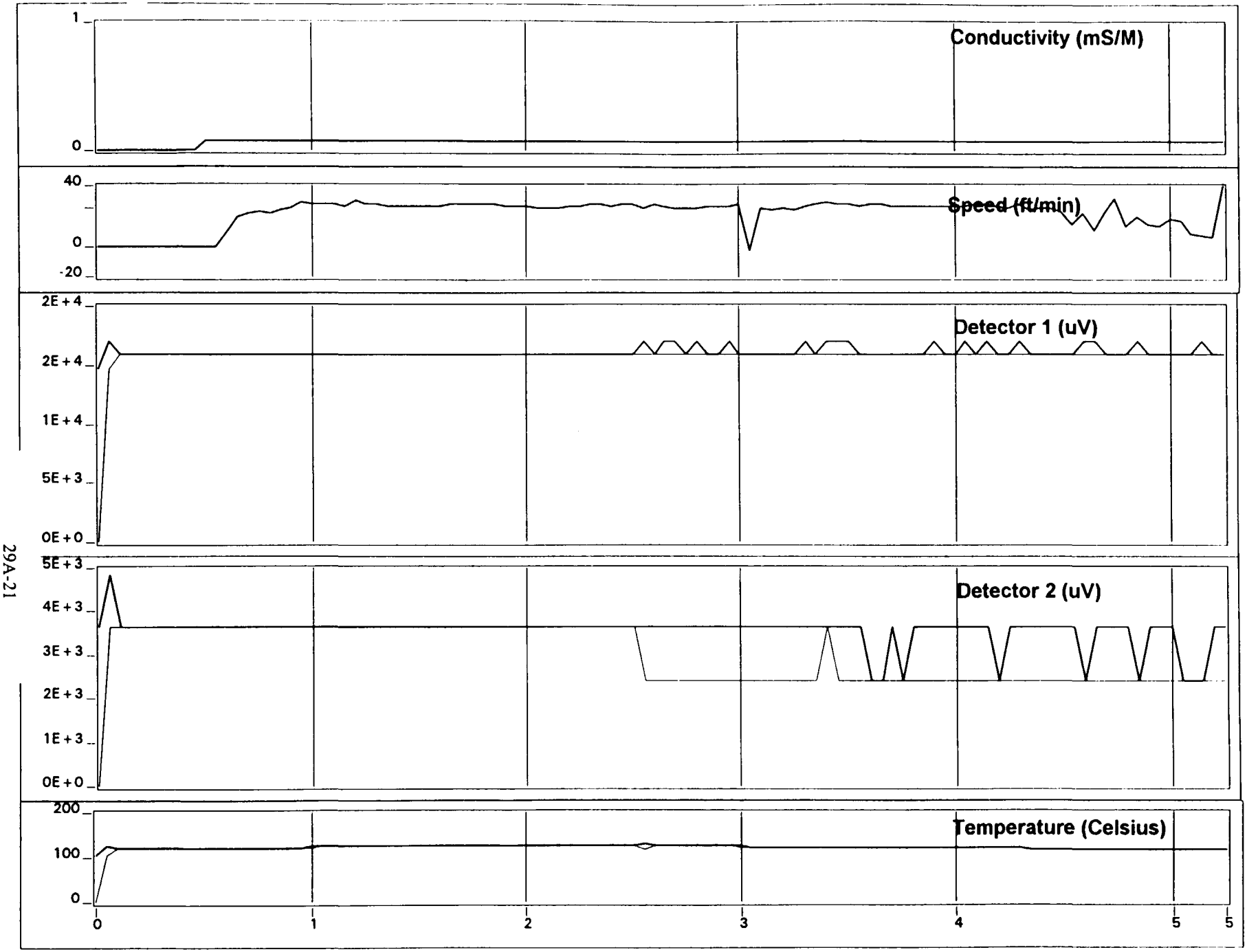

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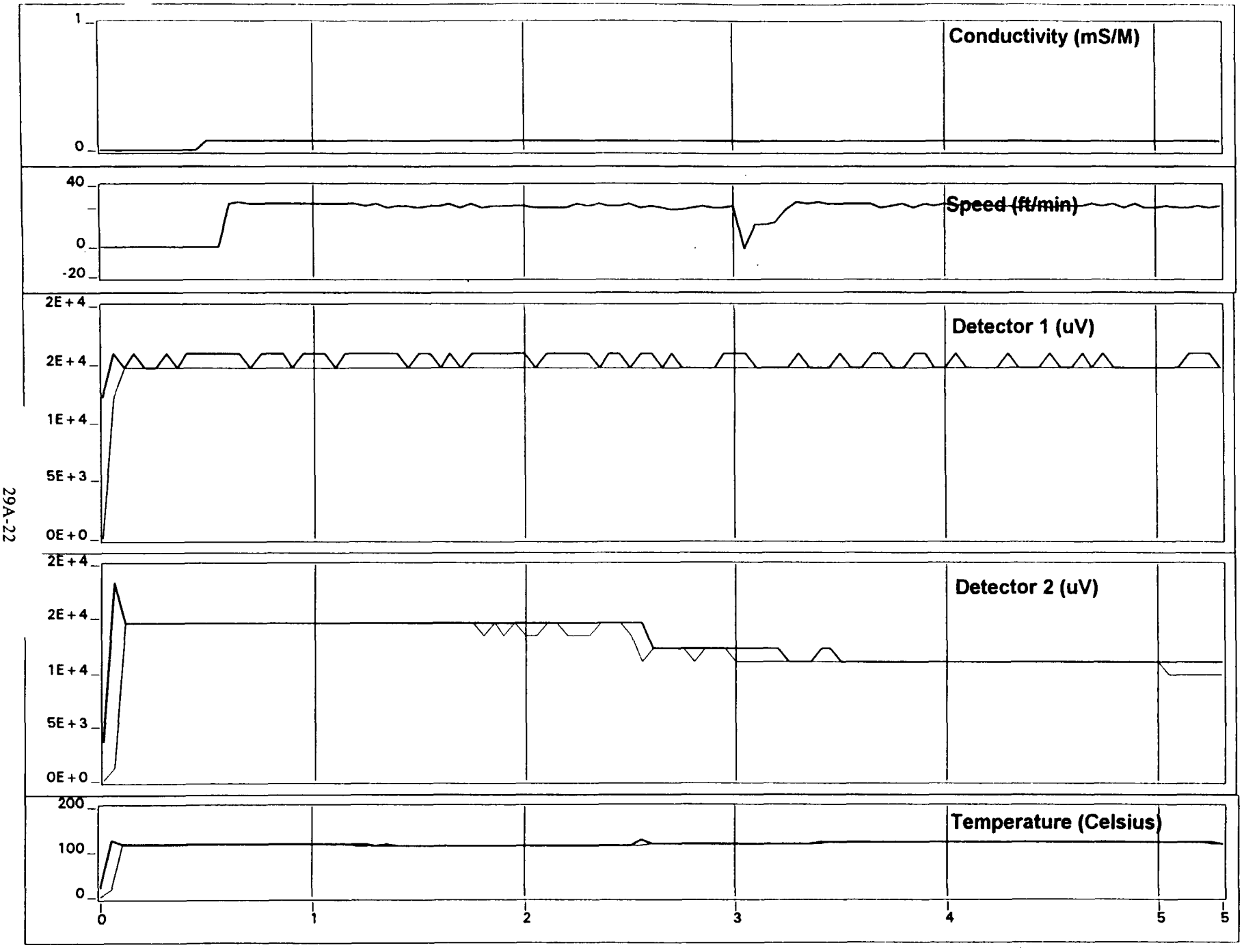
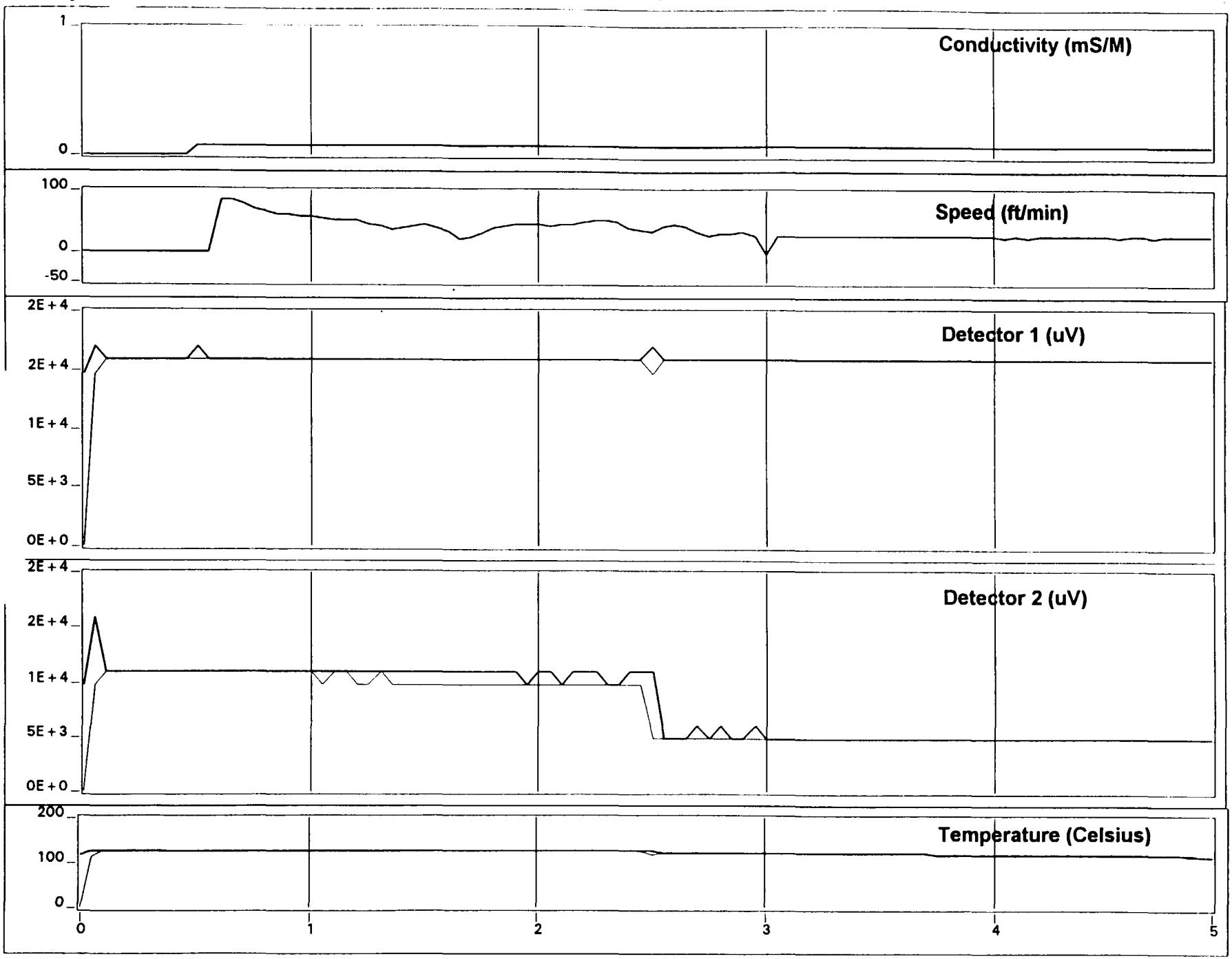
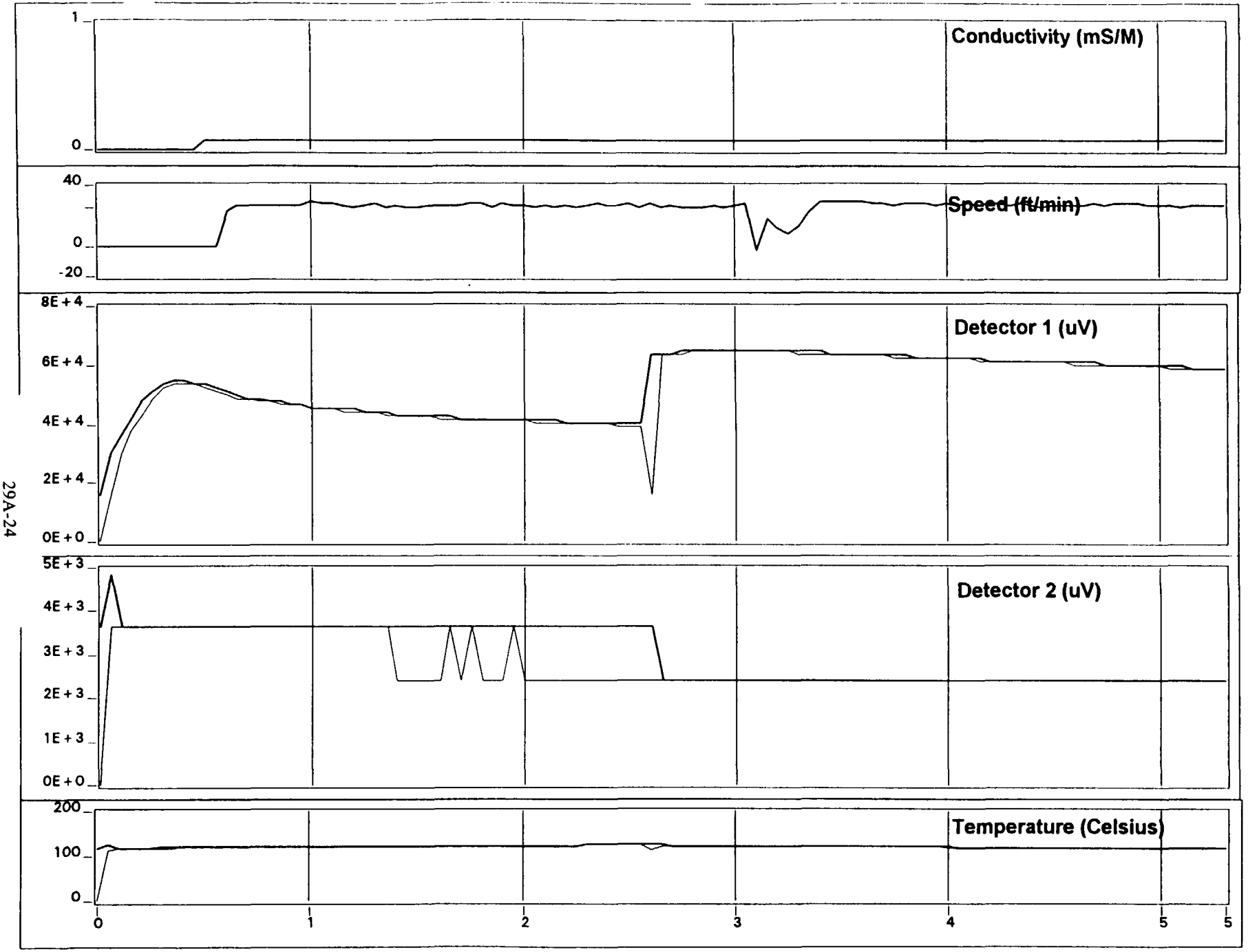


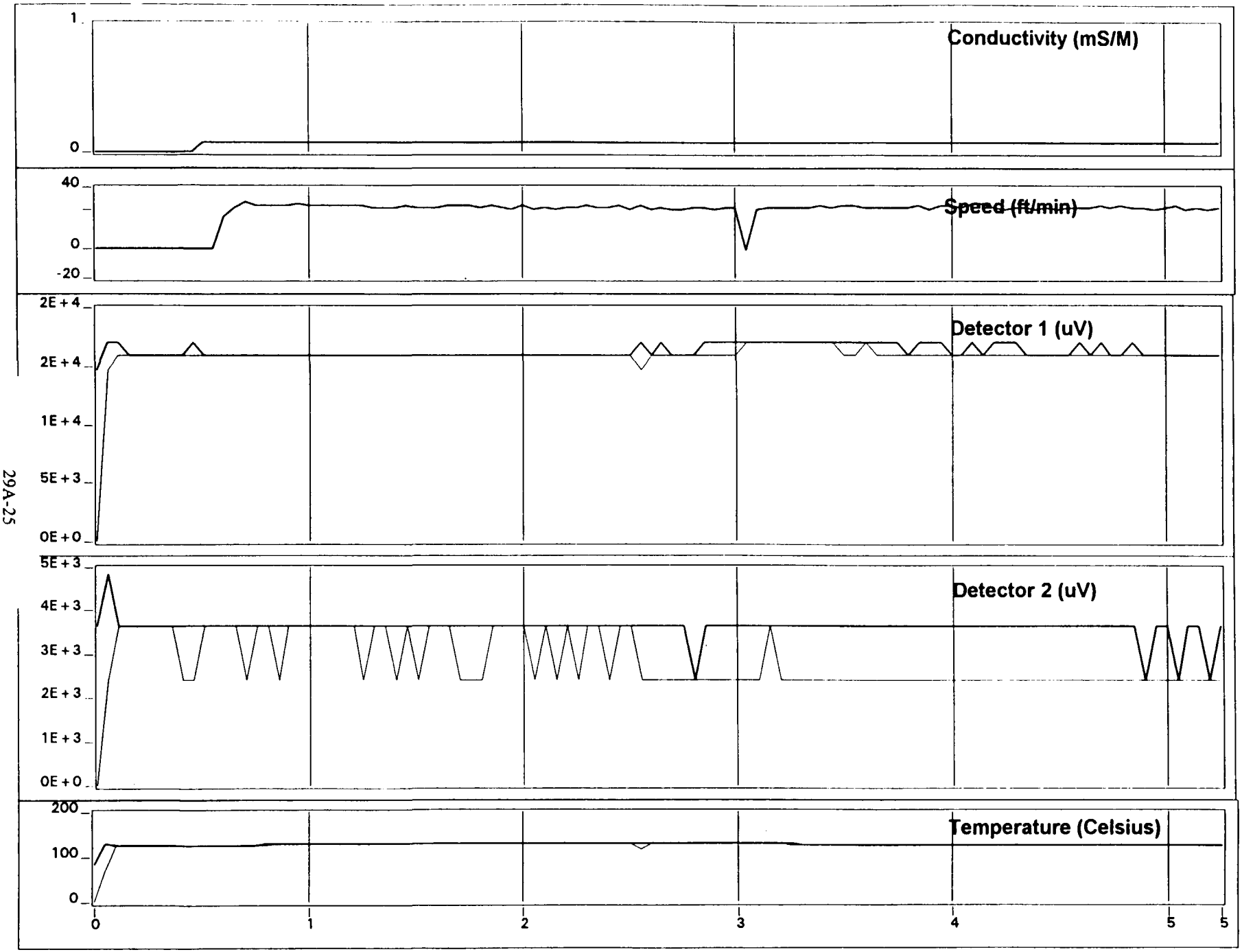
Log: | A( )GFILES\SGH05.DAT



Log: | A:\ ]GFILES\SGH06.DAT



Log: | A: GFILES\SGHO7.DAT



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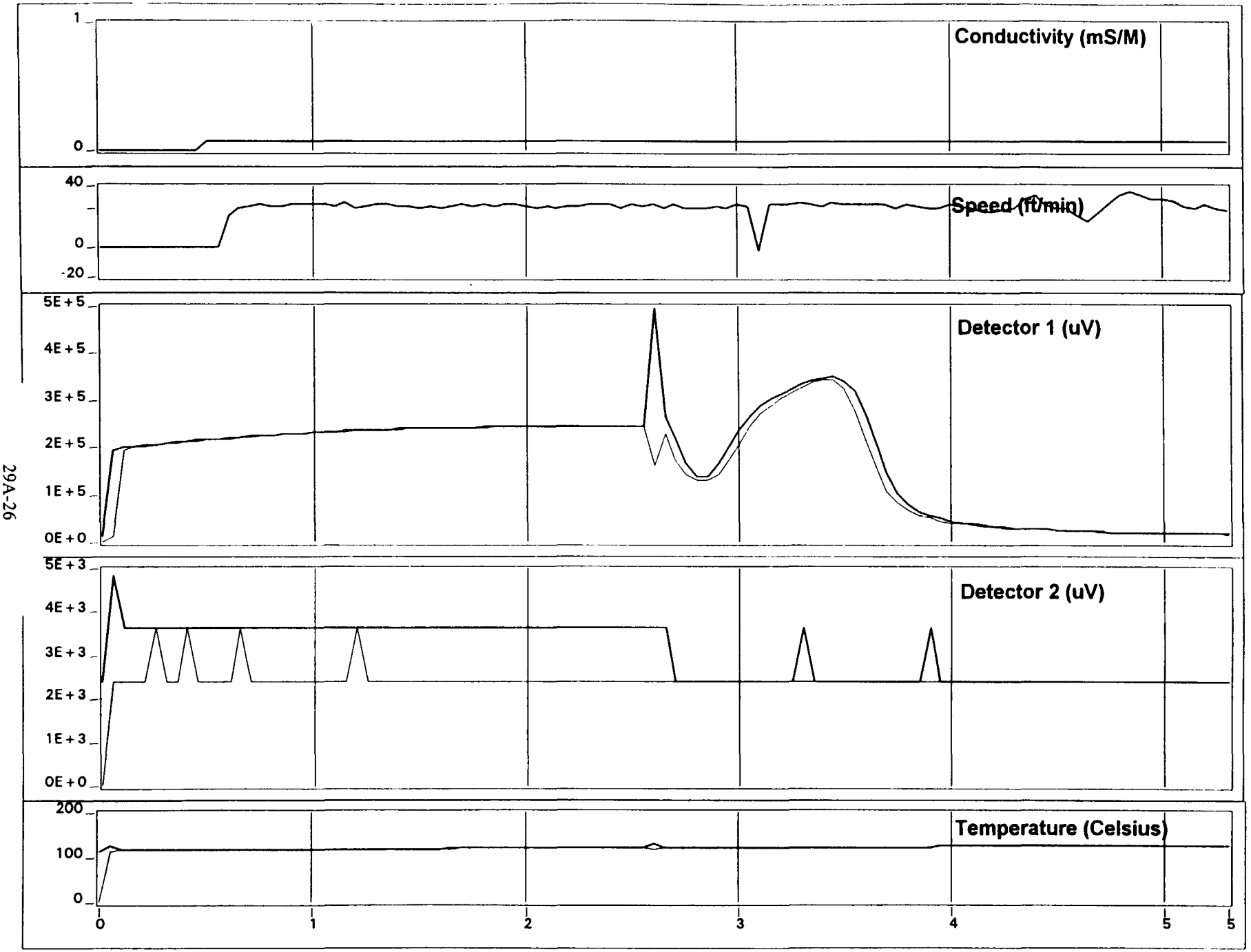
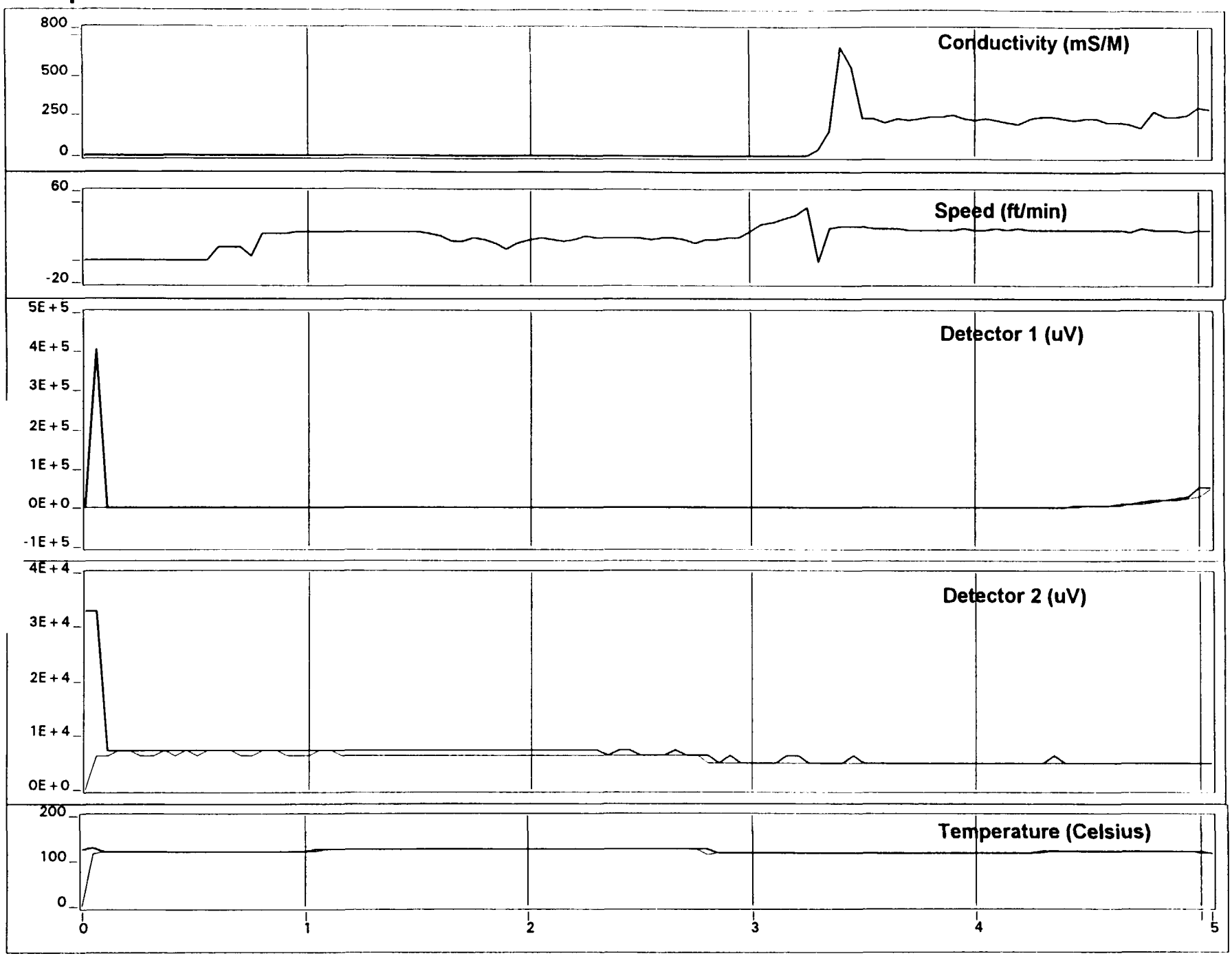
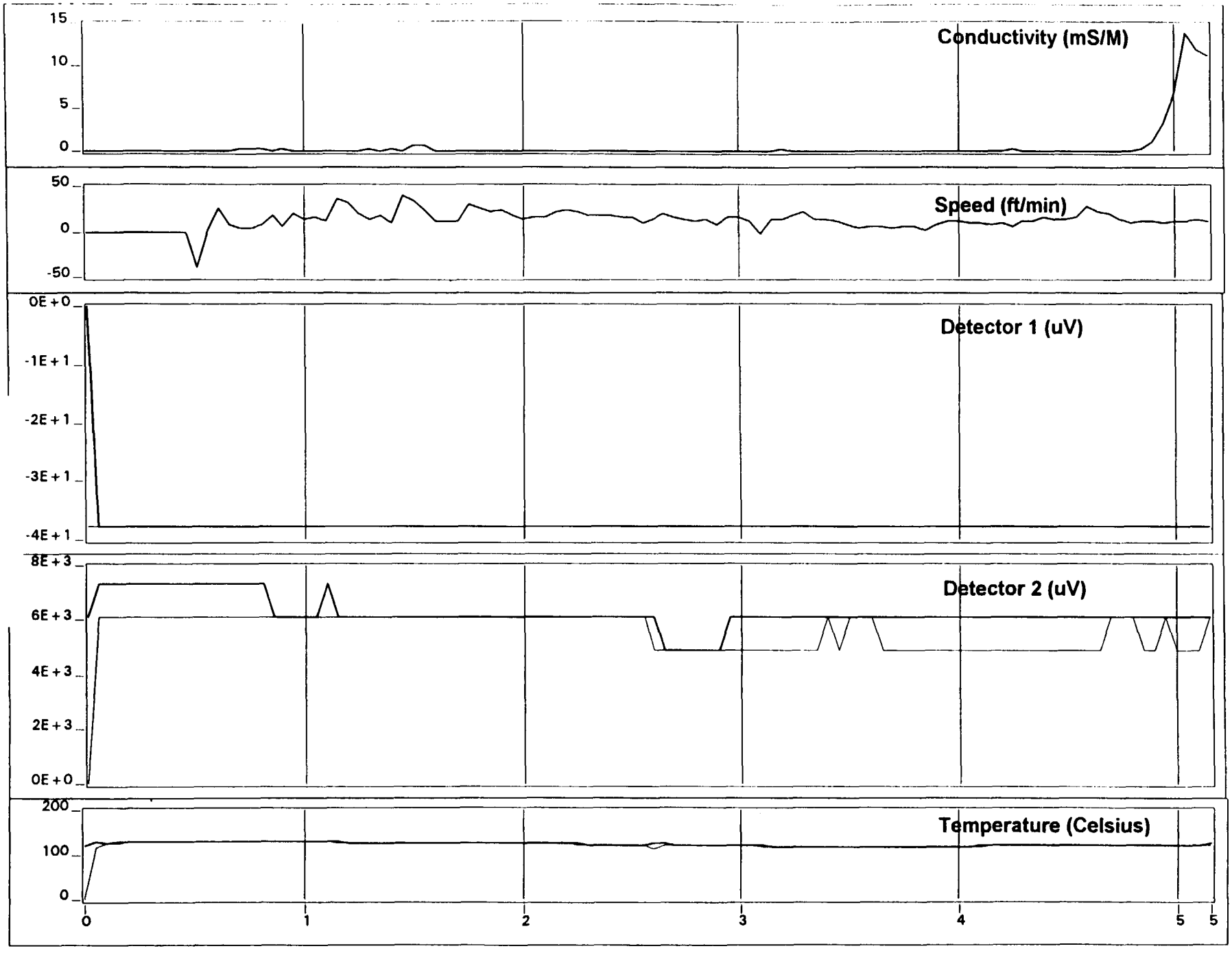
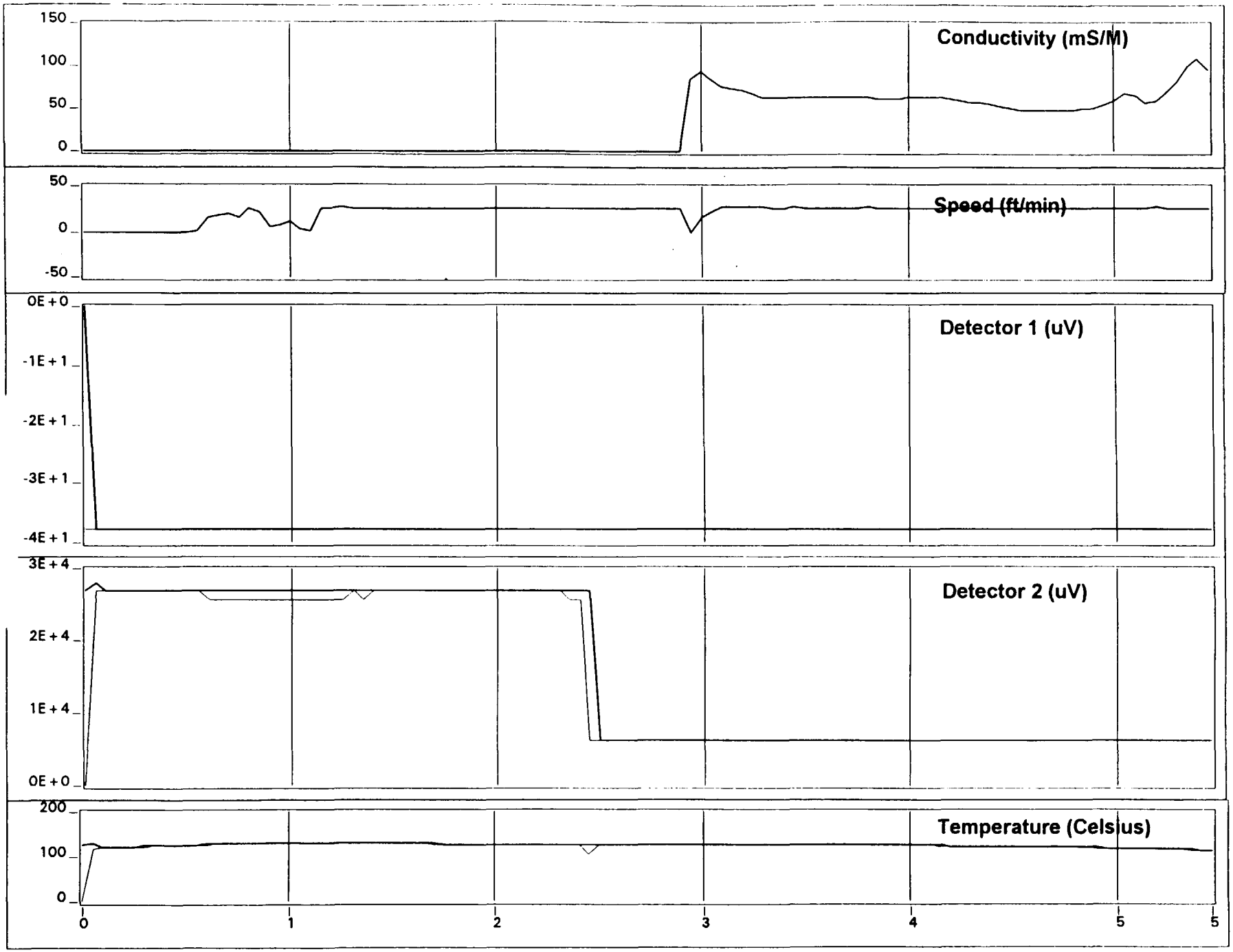


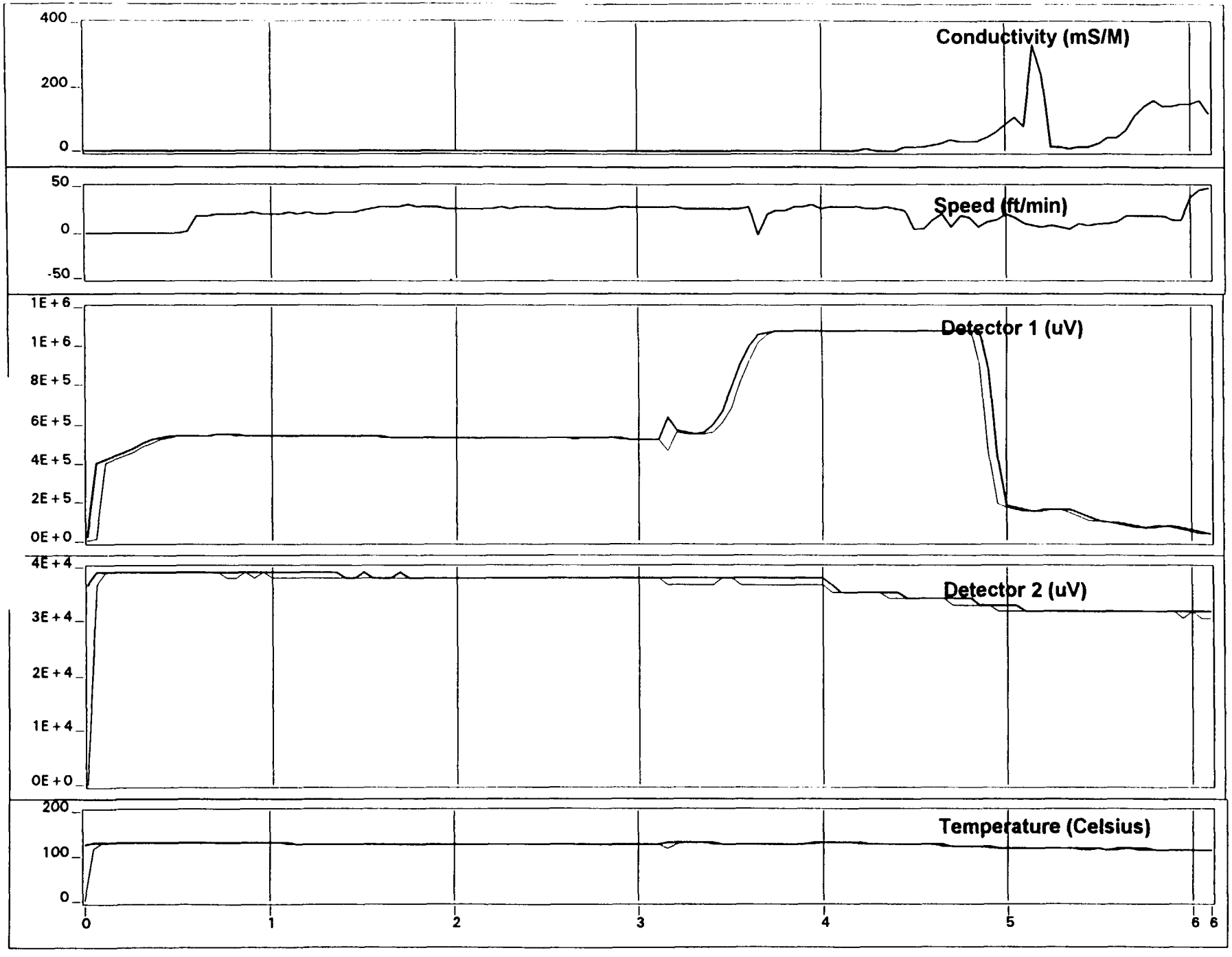

Log: | A gfiles\SGHNE000.DAT
800
500
250
0
Conductivity (mS/M)
60
-20
Speed (ft/min)
5E+5
4E+5
3E+5
2E+5
1E+5
0E+0
-1E+5
Detector 1 (uV)
4E+4
3E+4
2E+4
1E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5

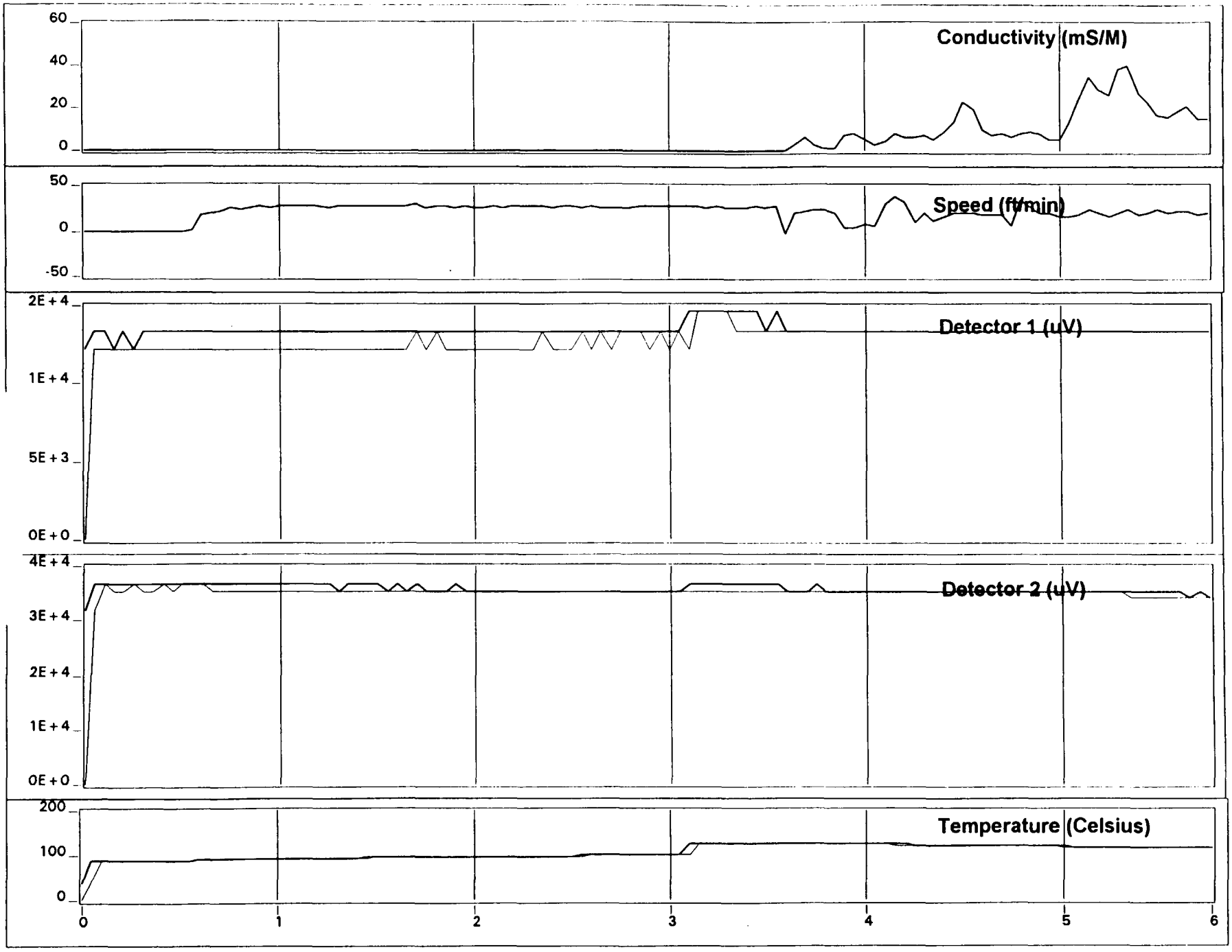

Log: | A:)GFILES\SGHNE100.DAT
15
10
5
0
Conductivity (mS/M)
50
0
-50
Speed (ft/min)
0E+0
-1E+1
-2E+1
-3E+1
-4E+1
Detector 1 (uV)
8E+3
6E+3
4E+3
2E+3
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5
5

Log: | A DGFILES\SGHNE160.DAT

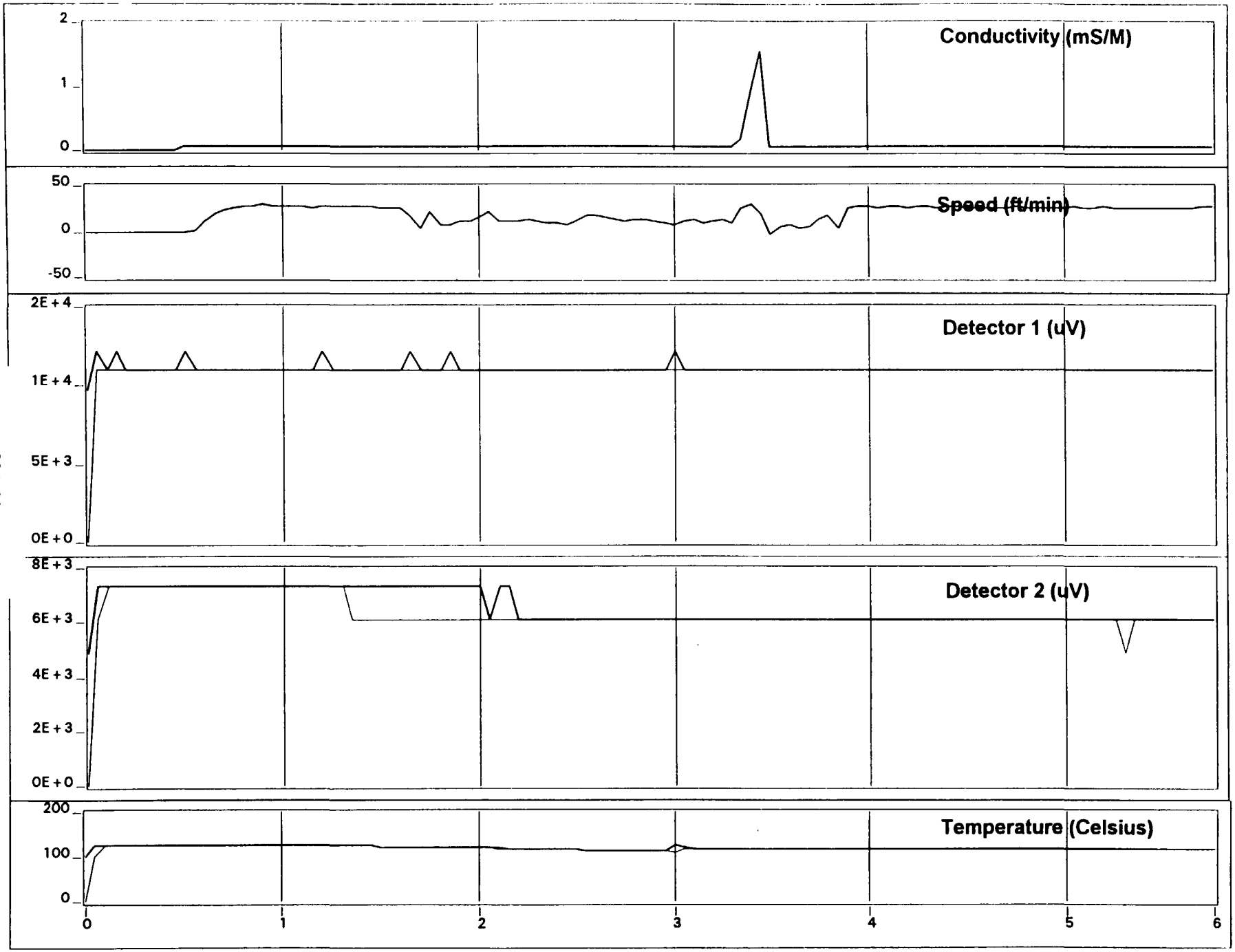


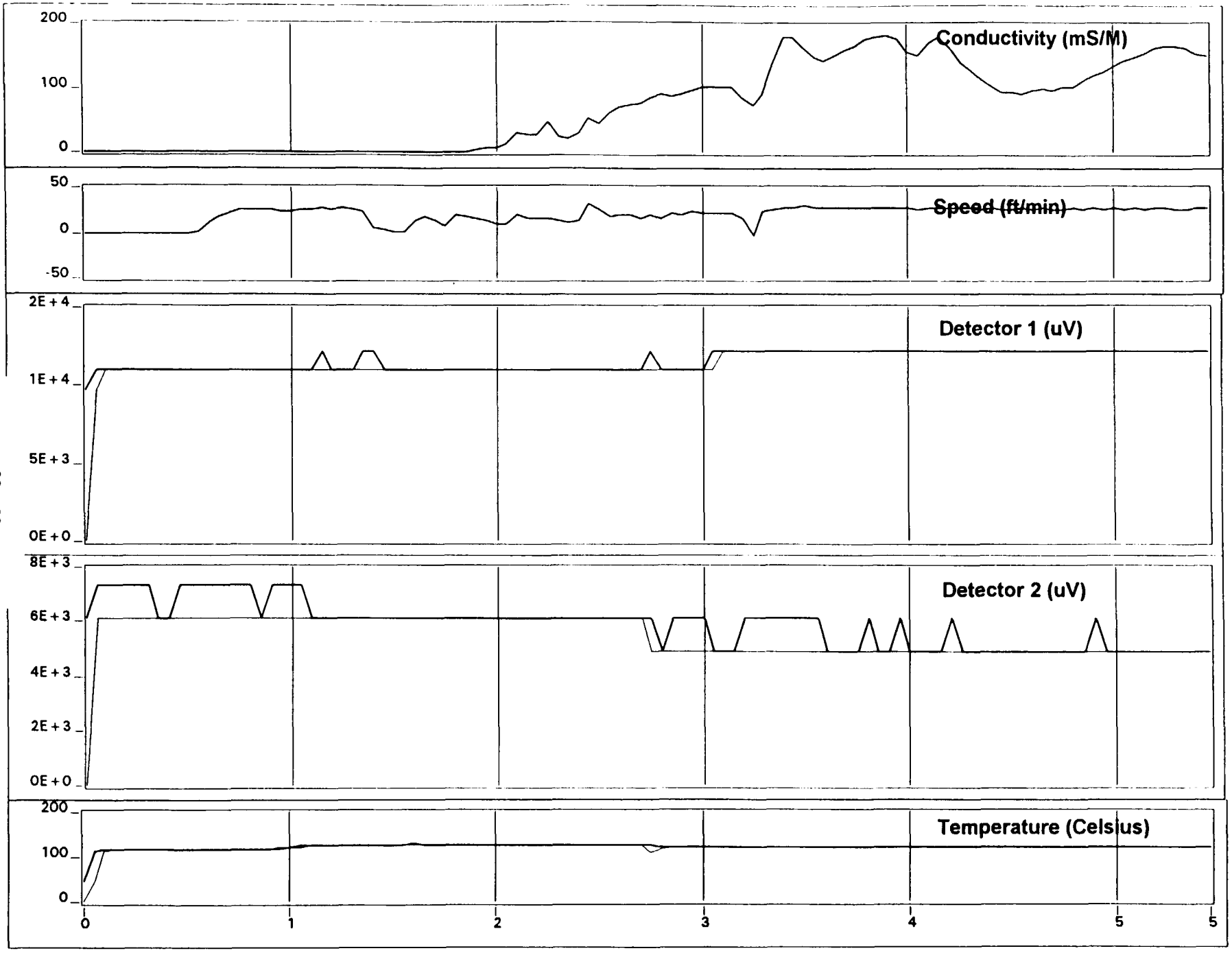
Log: | A:)GFILES\SGHNW000.DAT



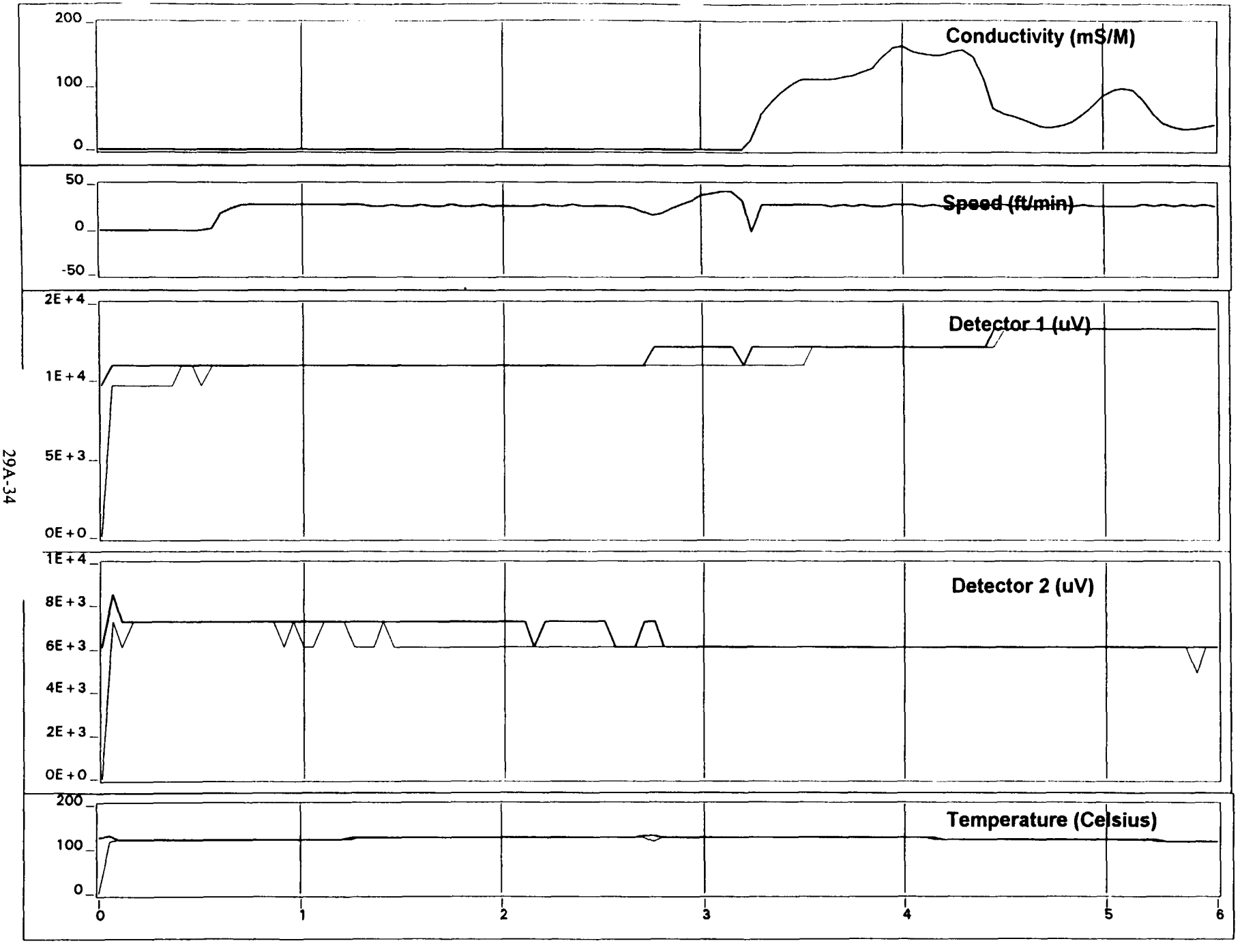

Log: A:)GFILES\SGHNW100.DAT
Conductivity (mS/M)
60
40
20
0
Speed (ft/min)
50
0
-50
Detector 1 (uV)
2E+4
1E+4
5E+3
0E+0
Detector 2 (uV)
4E+4
3E+4
2E+4
1E+4
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

Log: | A:')GFILES\SGHSW000.DAT

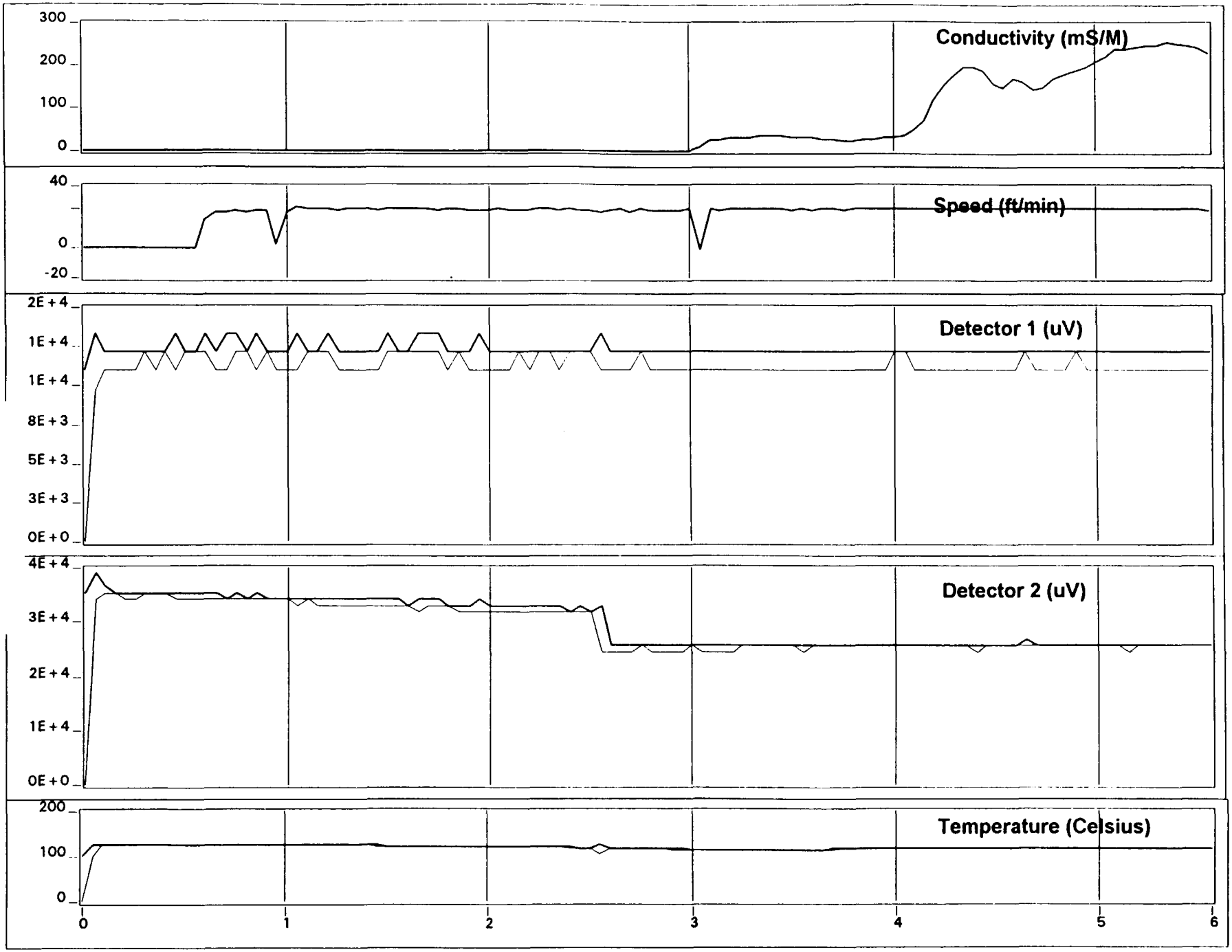



Log: A GFILES\SGHSW100.DAT
200
100
0
Conductivity (mS/M)
50
0
-50
Speed (ft/min)
2E+4
1E+4
5E+3
0E+0
Detector 1 (uV)
8E+3
6E+3
4E+3
2E+3
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5
5

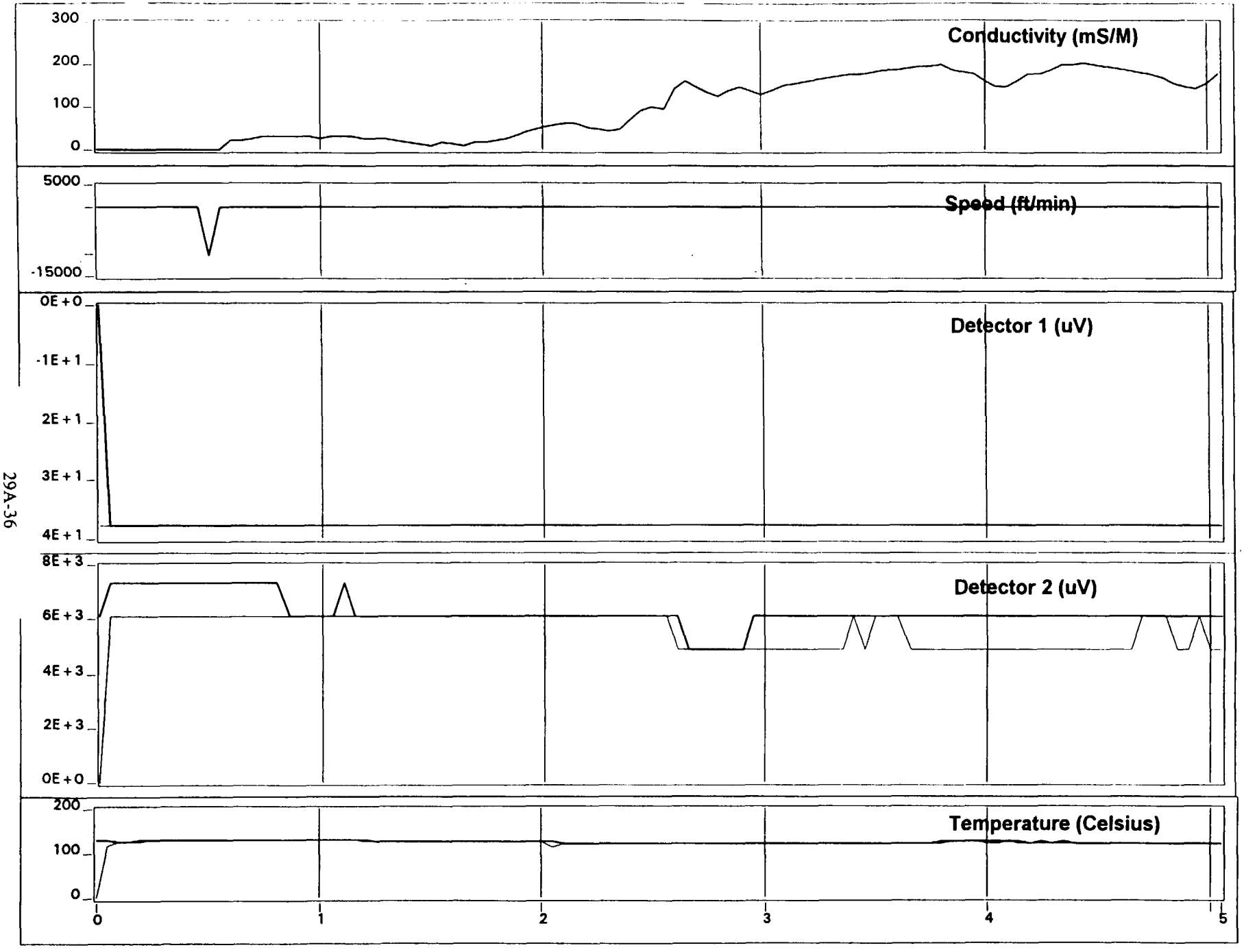
Log: A:)GFILES\SGHSW200.DAT



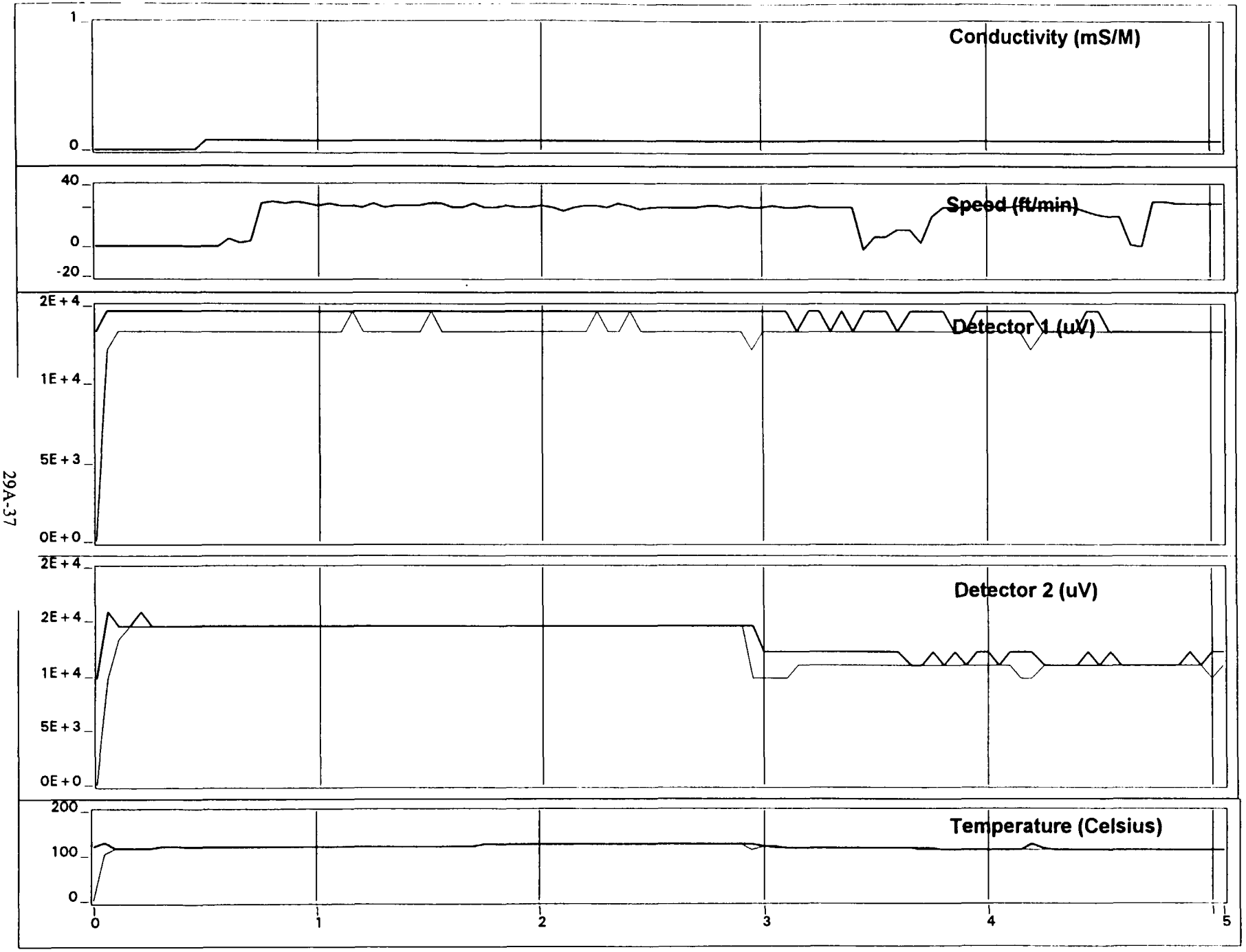
Log: A( )GFILES\SGHE000.DAT



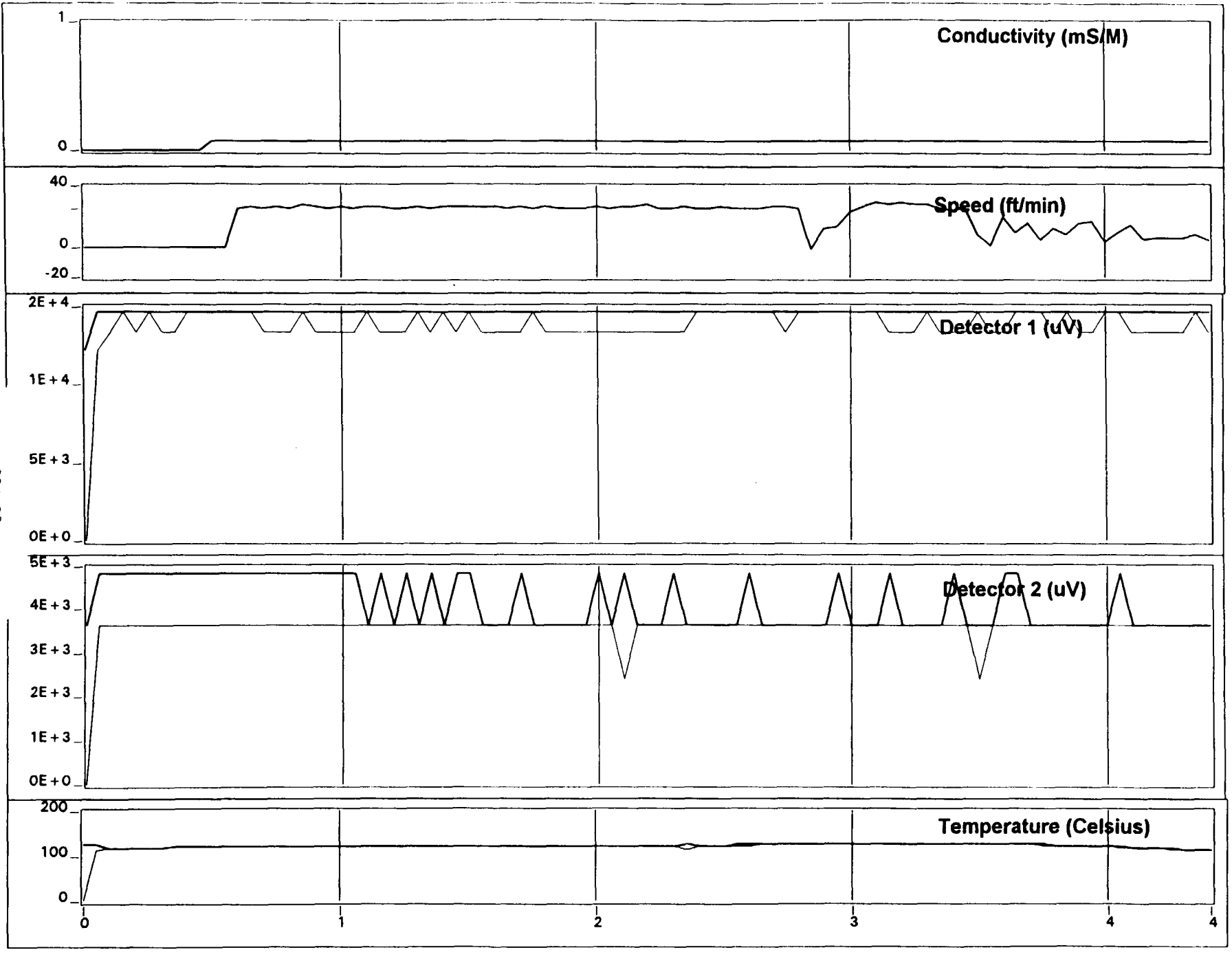
Log: A: \GFILES\SGHE100.DAT



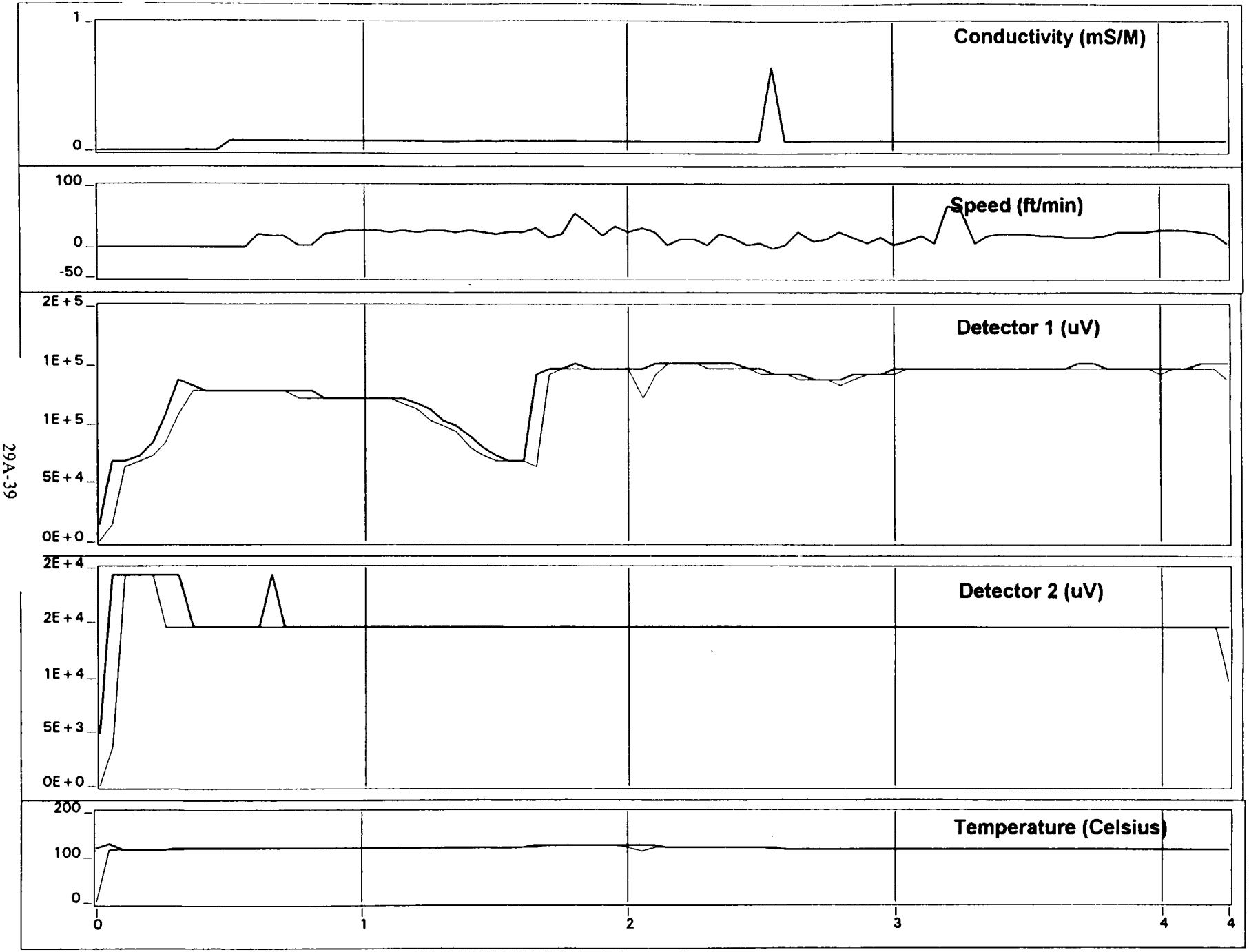
Log: | A:)GFILES\SGI01.DAT



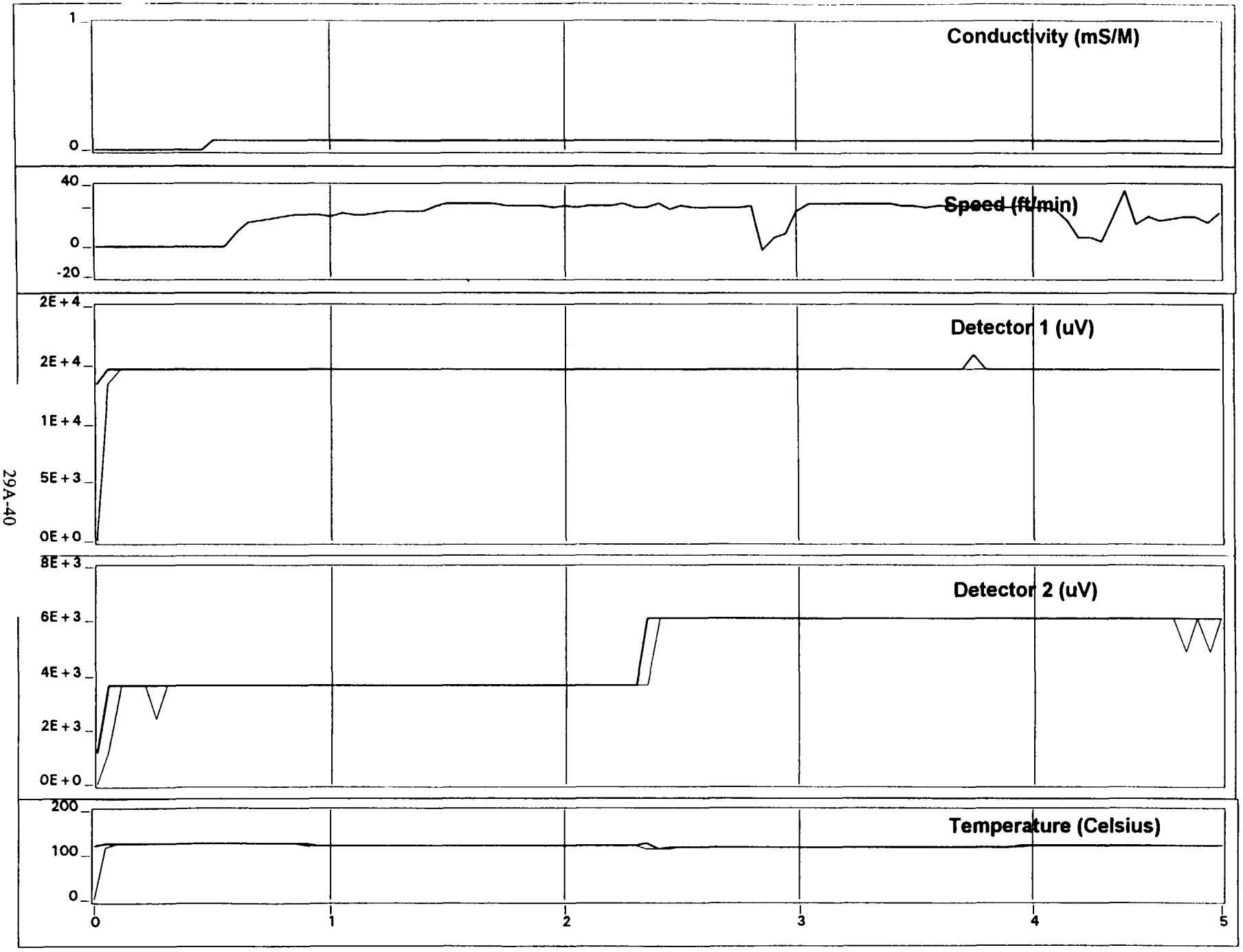
Log: A: \SGI0202.DAT



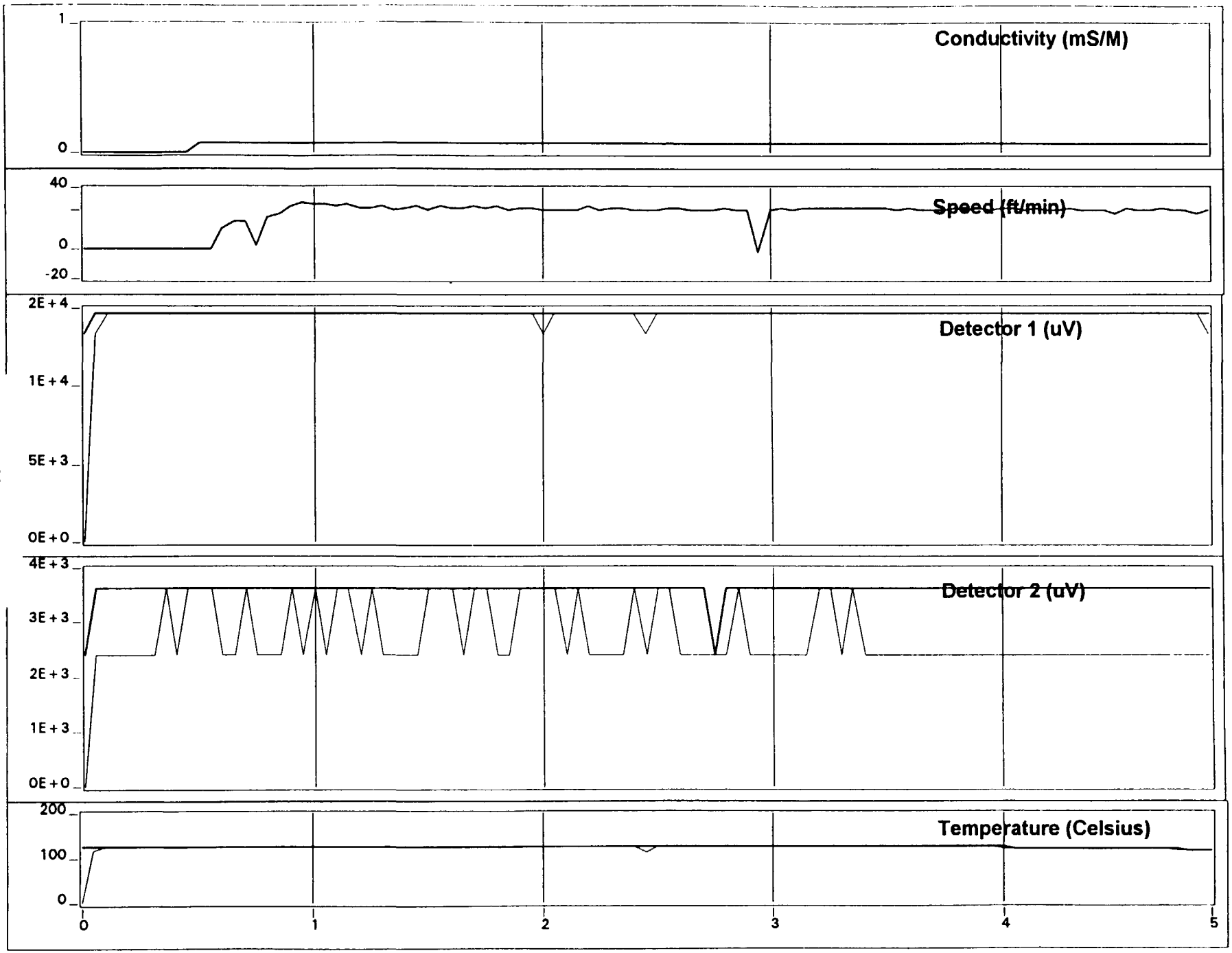
Log: | A:)GFILES\SGI03.DAT



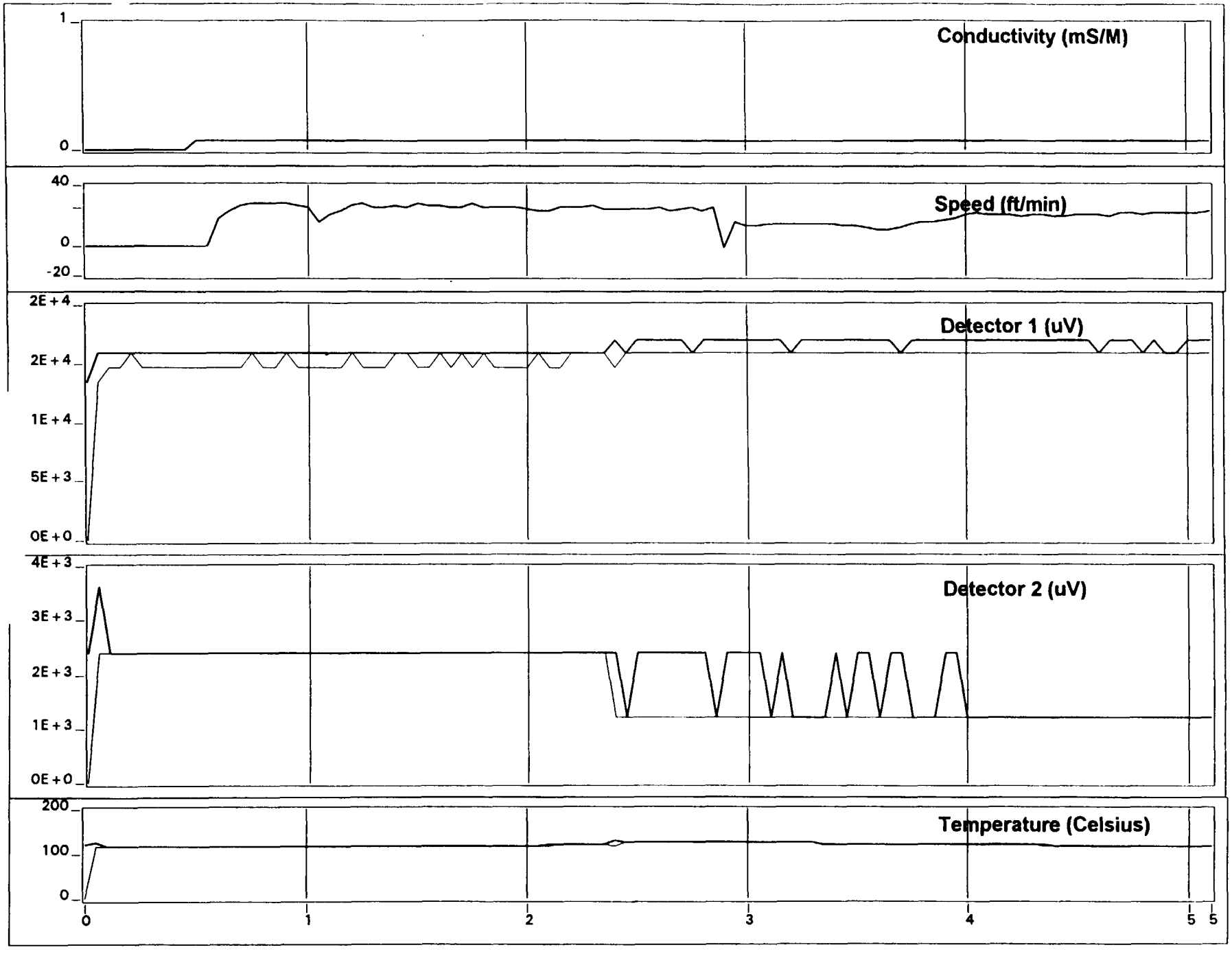
Log: | A:')GFILES\SGI04.DAT

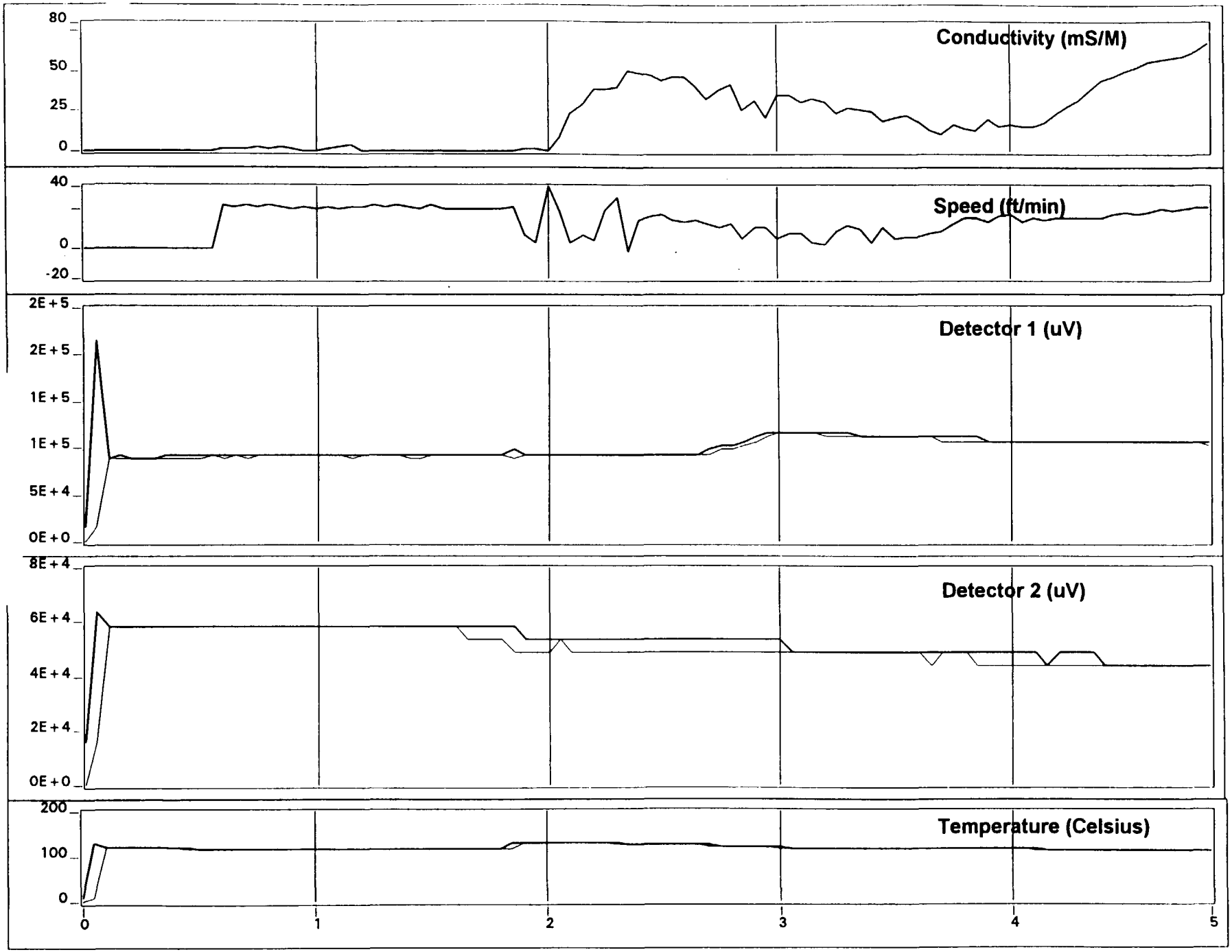


Log: A)GFILES\SGI05.DAT

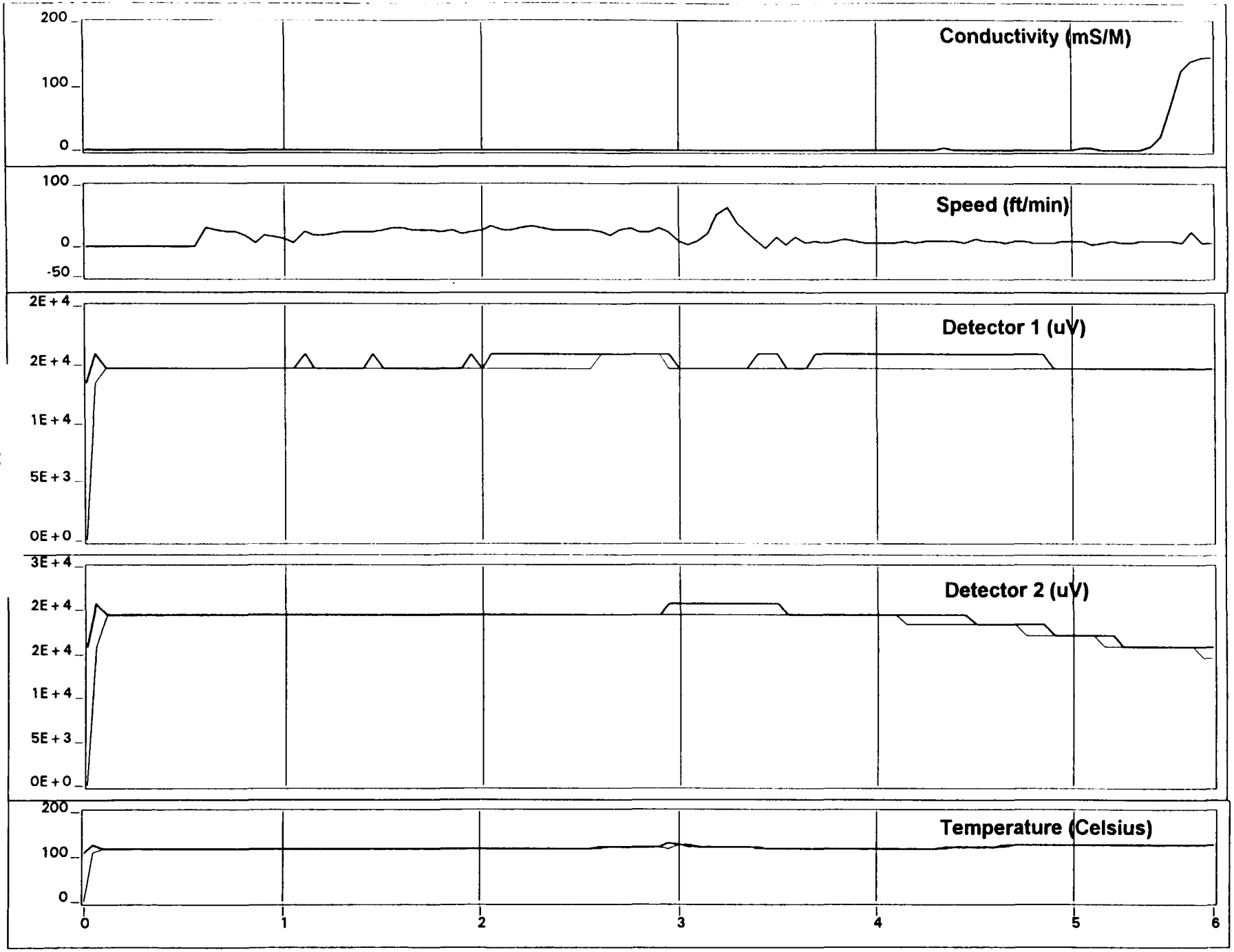


Log: A:)GFILES\SGI06.DAT

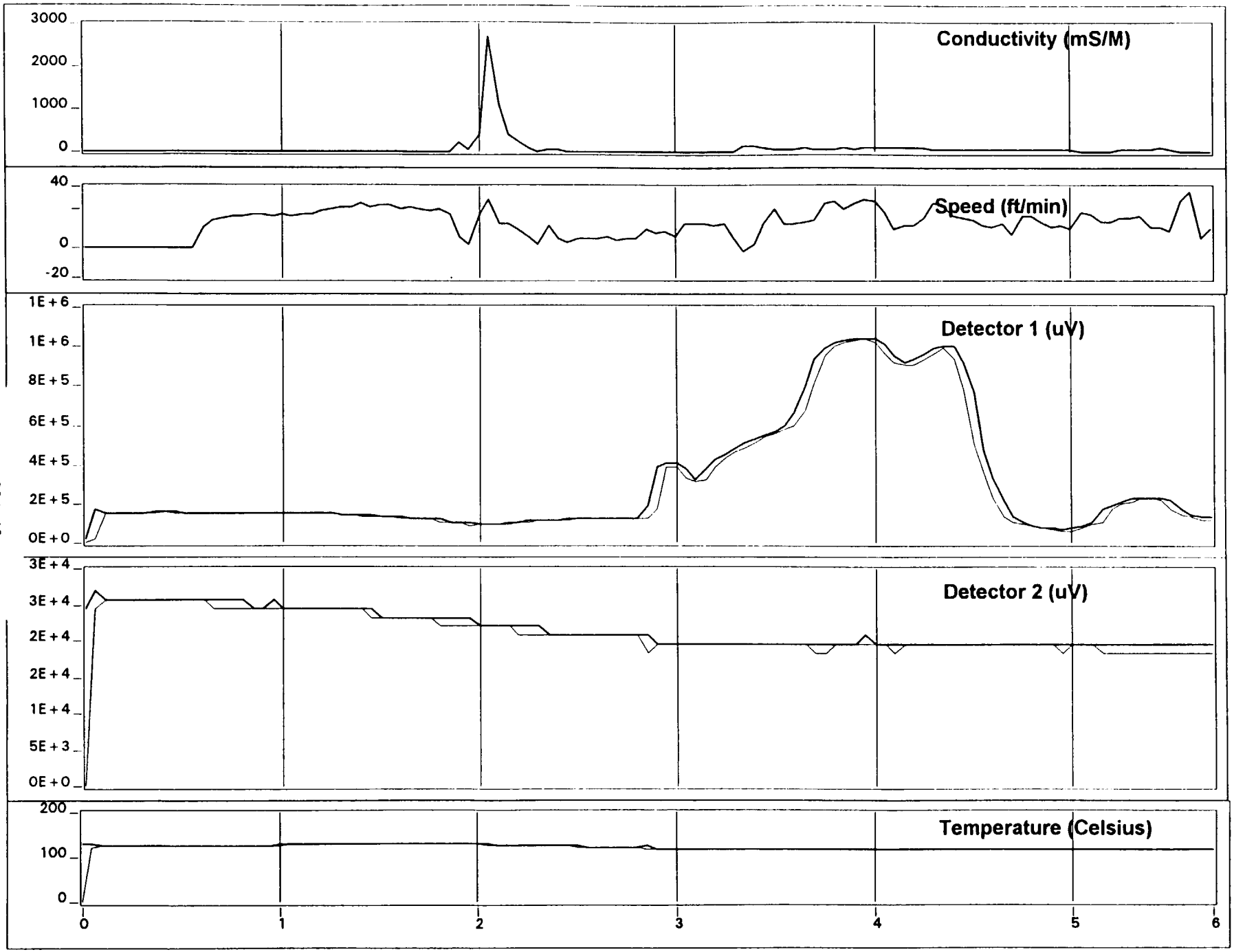



Log: | A)GFILES\SGI07.DAT
80
50
25
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
2E+5
2E+5
1E+5
1E+5
5E+4
0E+0
Detector 1 (uV)
8E+4
6E+4
4E+4
2E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5

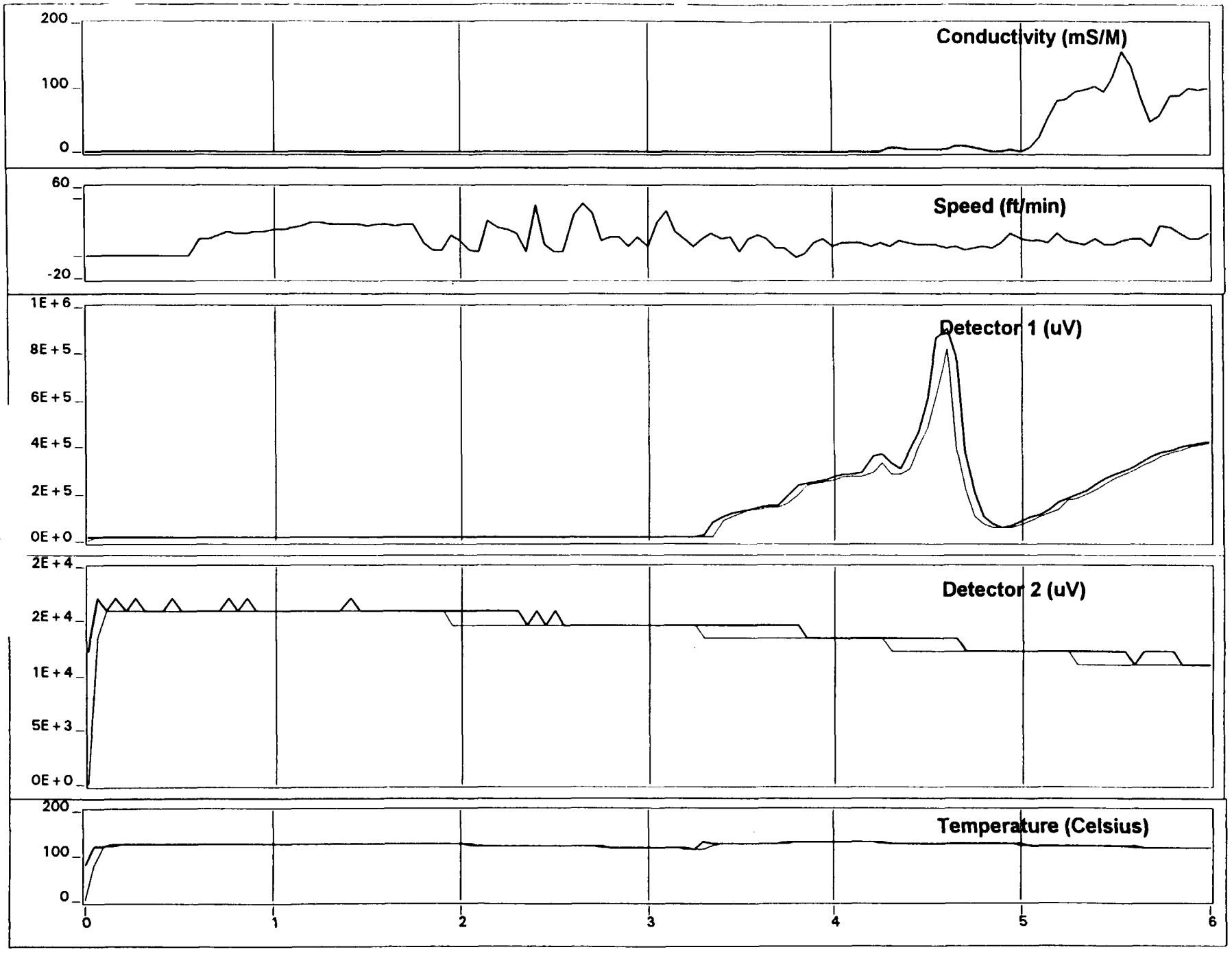
Log: | A: ⁾GFILES\SGI08.DAT

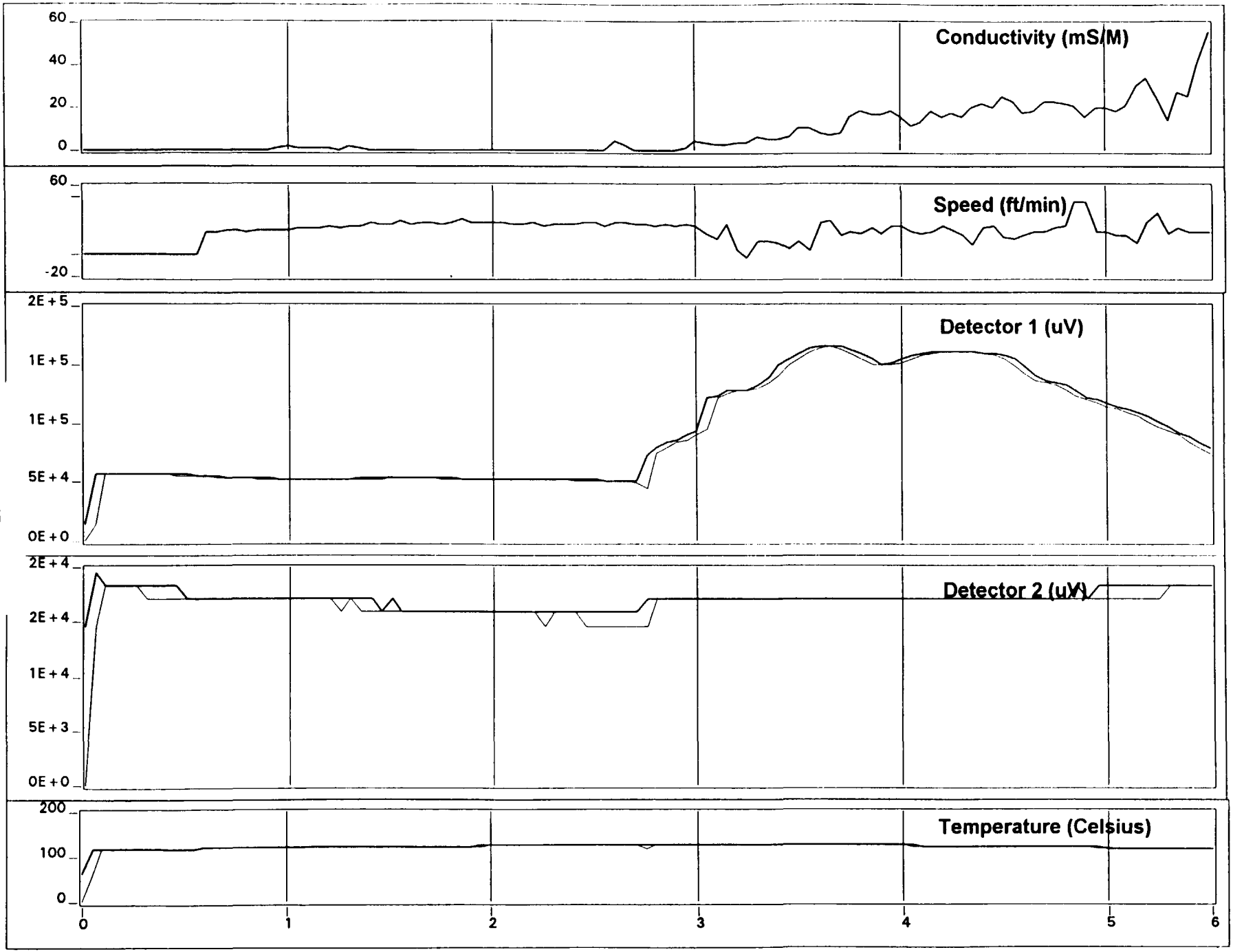


Log: | A( )GFILES\SGI09.DAT

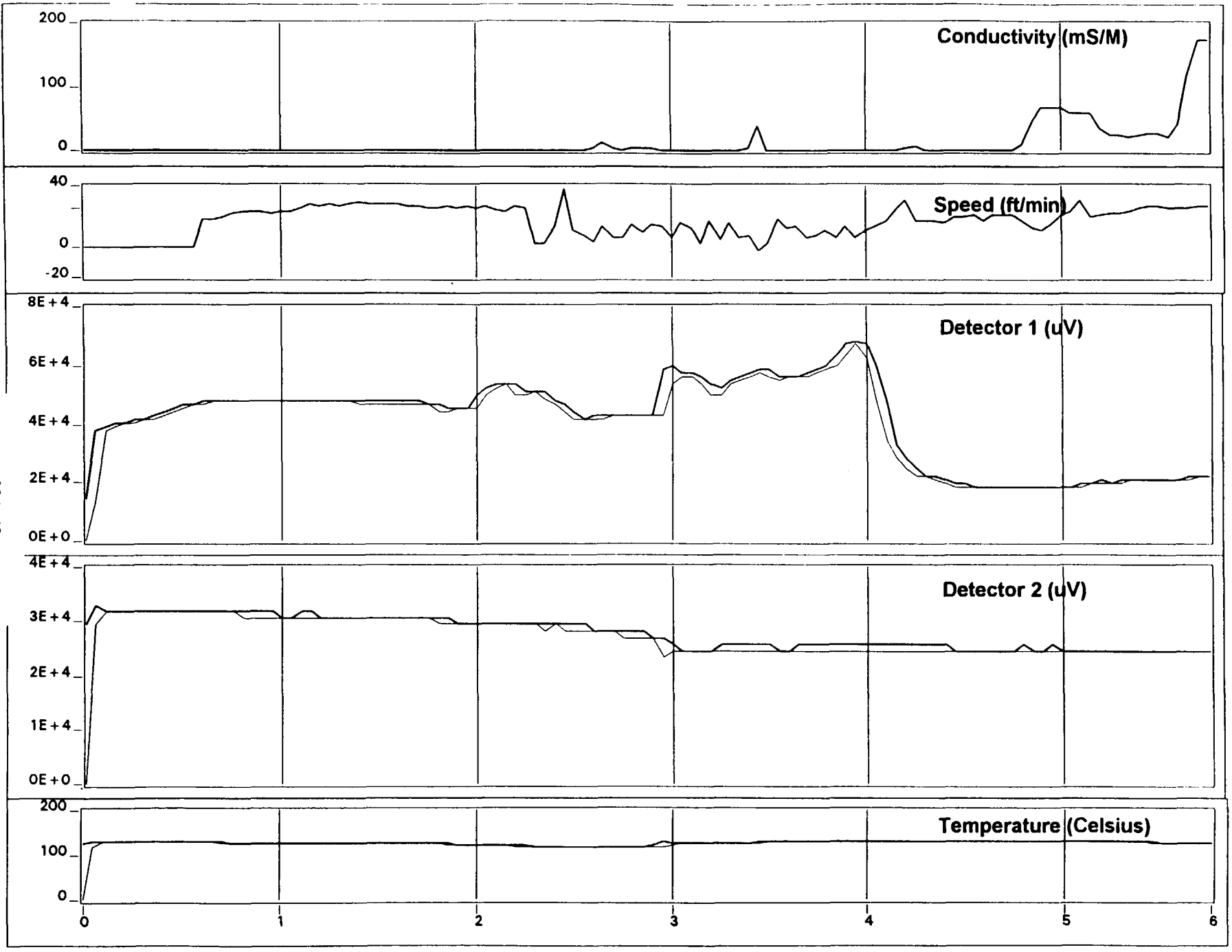


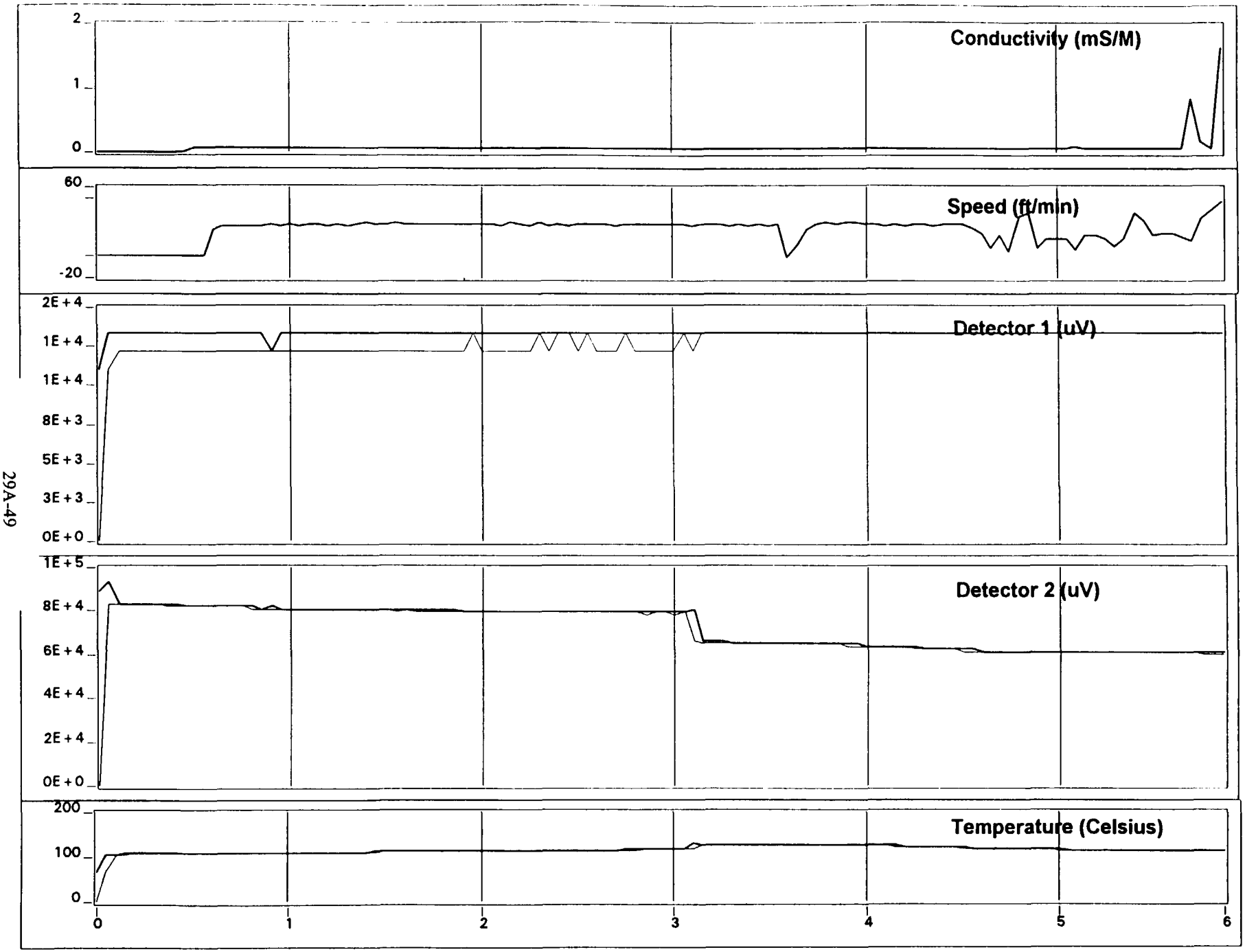
Log: A:\ OGFILES\SGI10.DAT



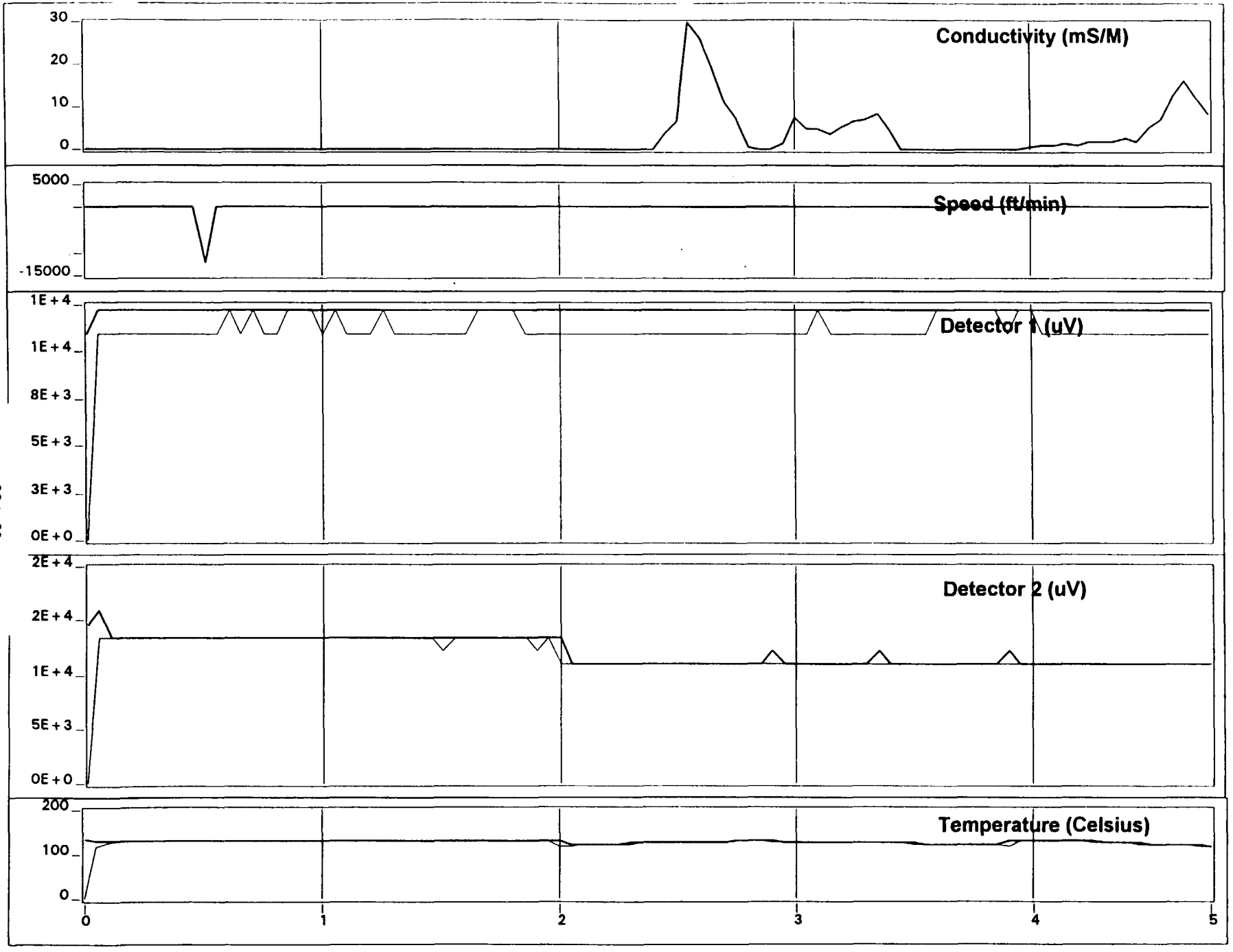

Log: A:)GFILES\SGI11.DAT
Conductivity (mS/M)
60
40
20
0
Speed (ft/min)
60
-20
Detector 1 (uV)
2E+5
1E+5
1E+5
5E+4
0E+0
Detector 2 (uV)
2E+4
2E+4
1E+4
5E+3
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

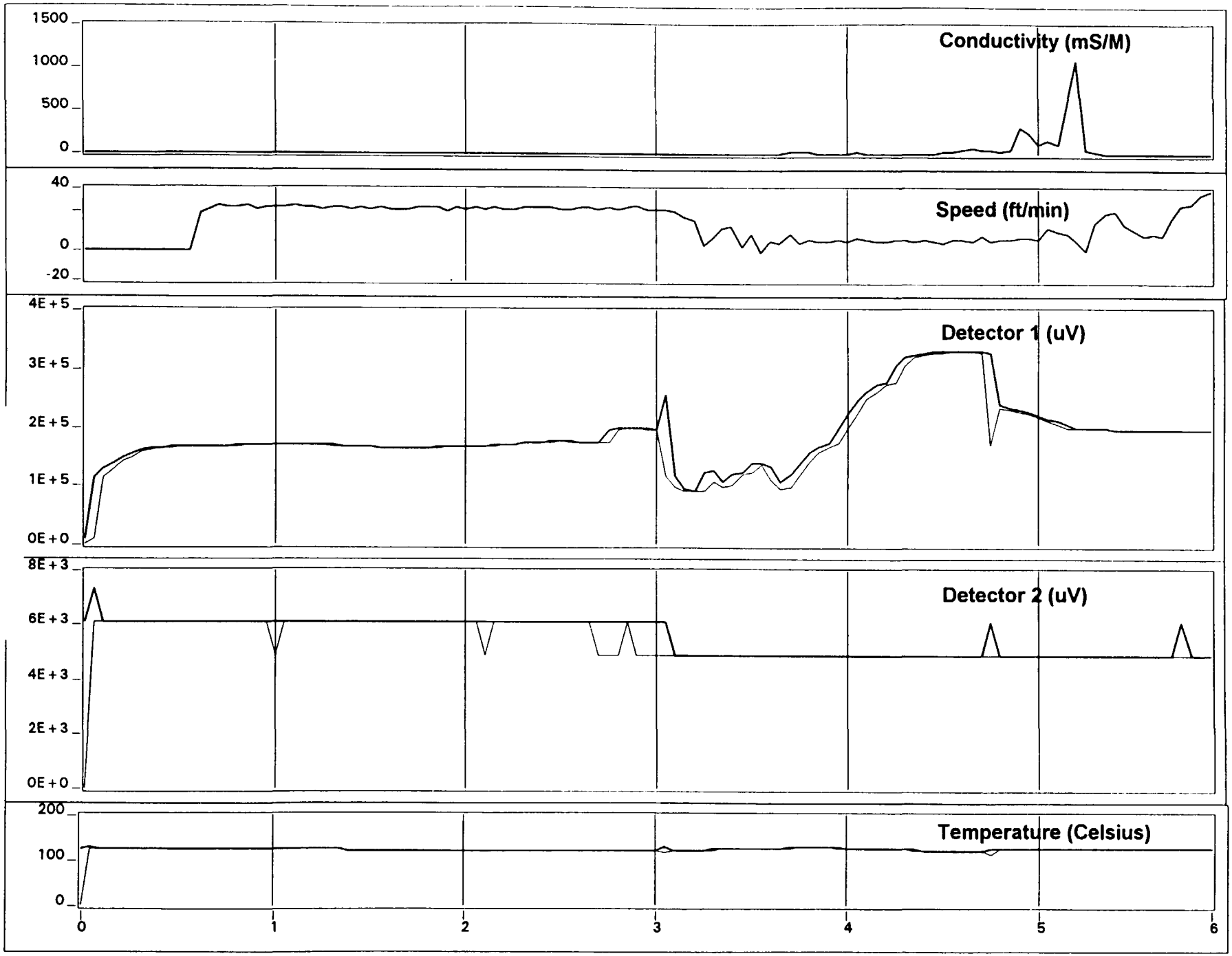
Log: | A:')GFILES\SGI12.DAT



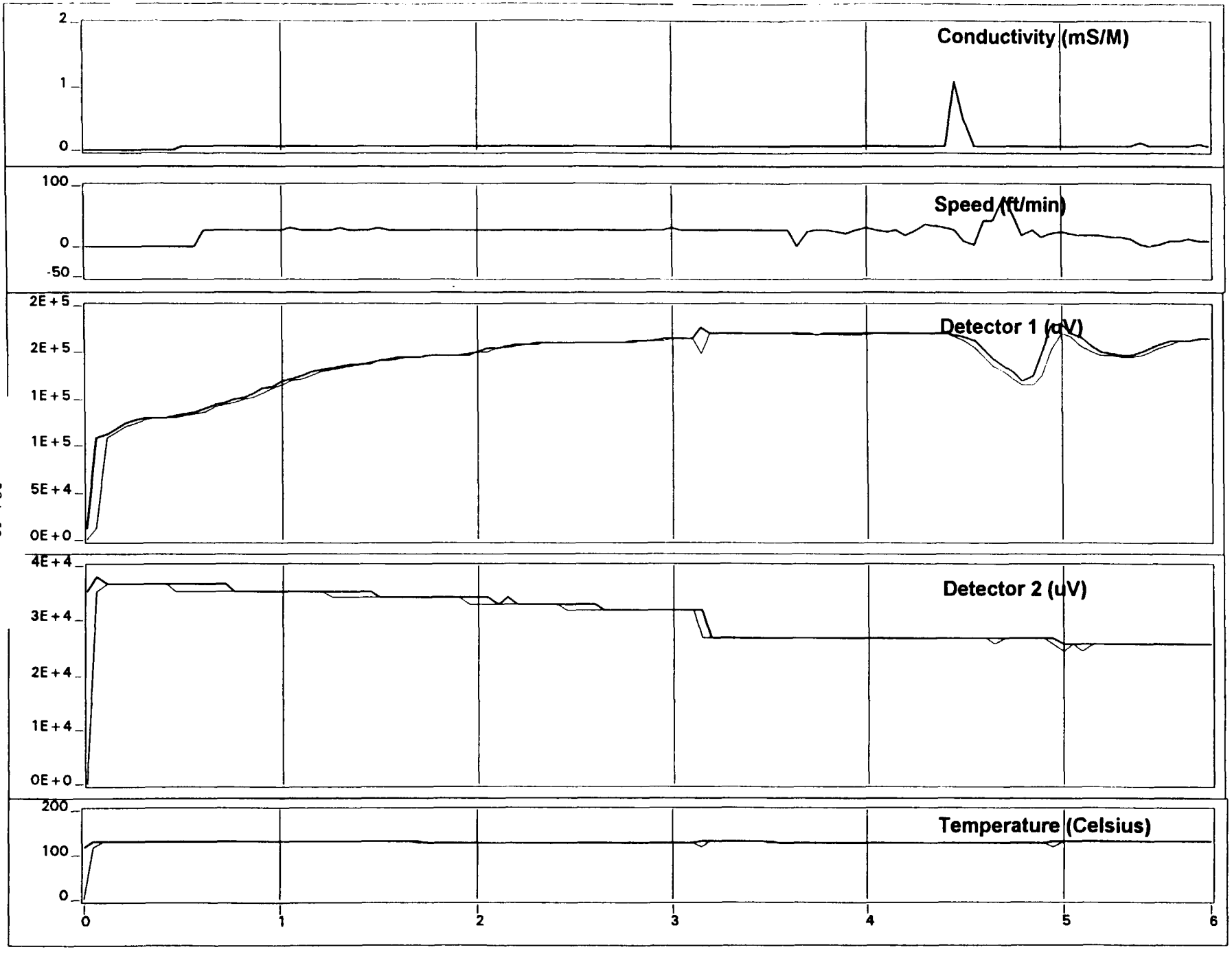

Log: A)GFILES\SGIN000.DAT
Conductivity (mS/M)
2
1
0
Speed (ft/min)
60
-20
Detector 1 (uV)
2E+4
1E+4
1E+4
8E+3
5E+3
3E+3
0E+0
Detector 2 (uV)
1E+5
8E+4
6E+4
4E+4
2E+4
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

Log: [A:\ ]GFILES\SGIN0100.DAT

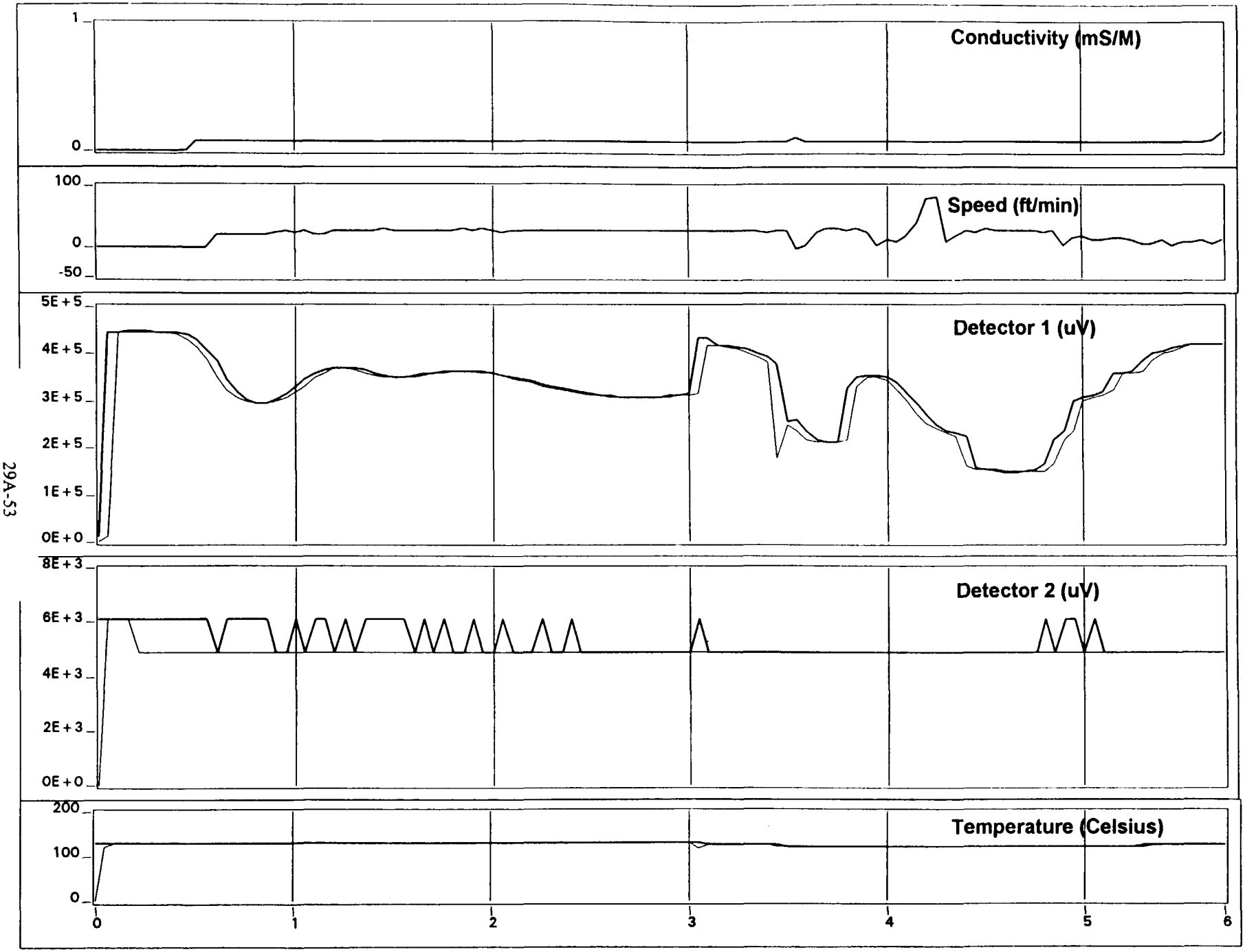



Log: A)GFILES\SGIS000.DAT
1500
1000
500
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
4E+5
3E+5
2E+5
1E+5
0E+0
Detector 1 (uV)
8E+3
6E+3
4E+3
2E+3
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5
6

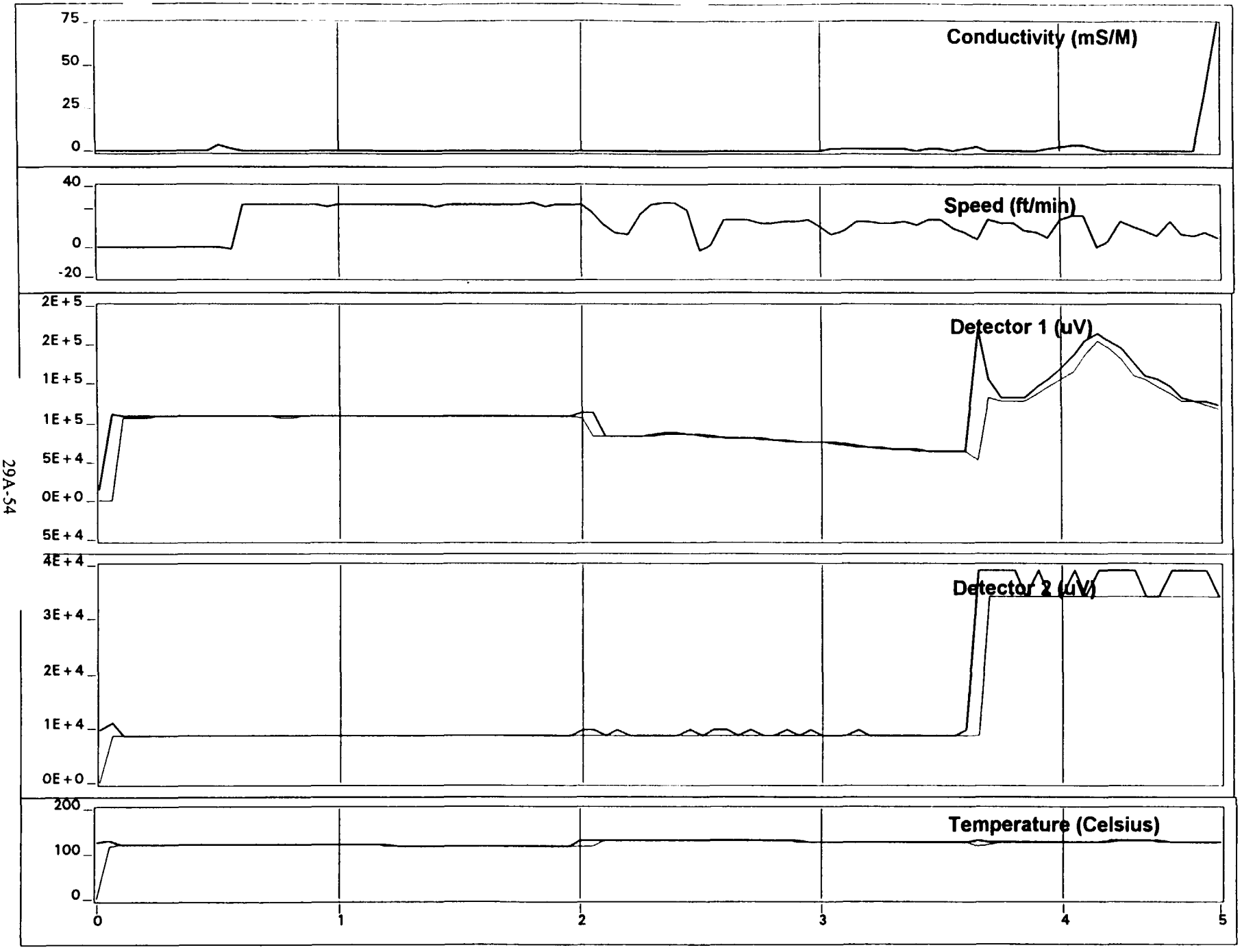
Log: A: \GFILES\SGIS100.DAT

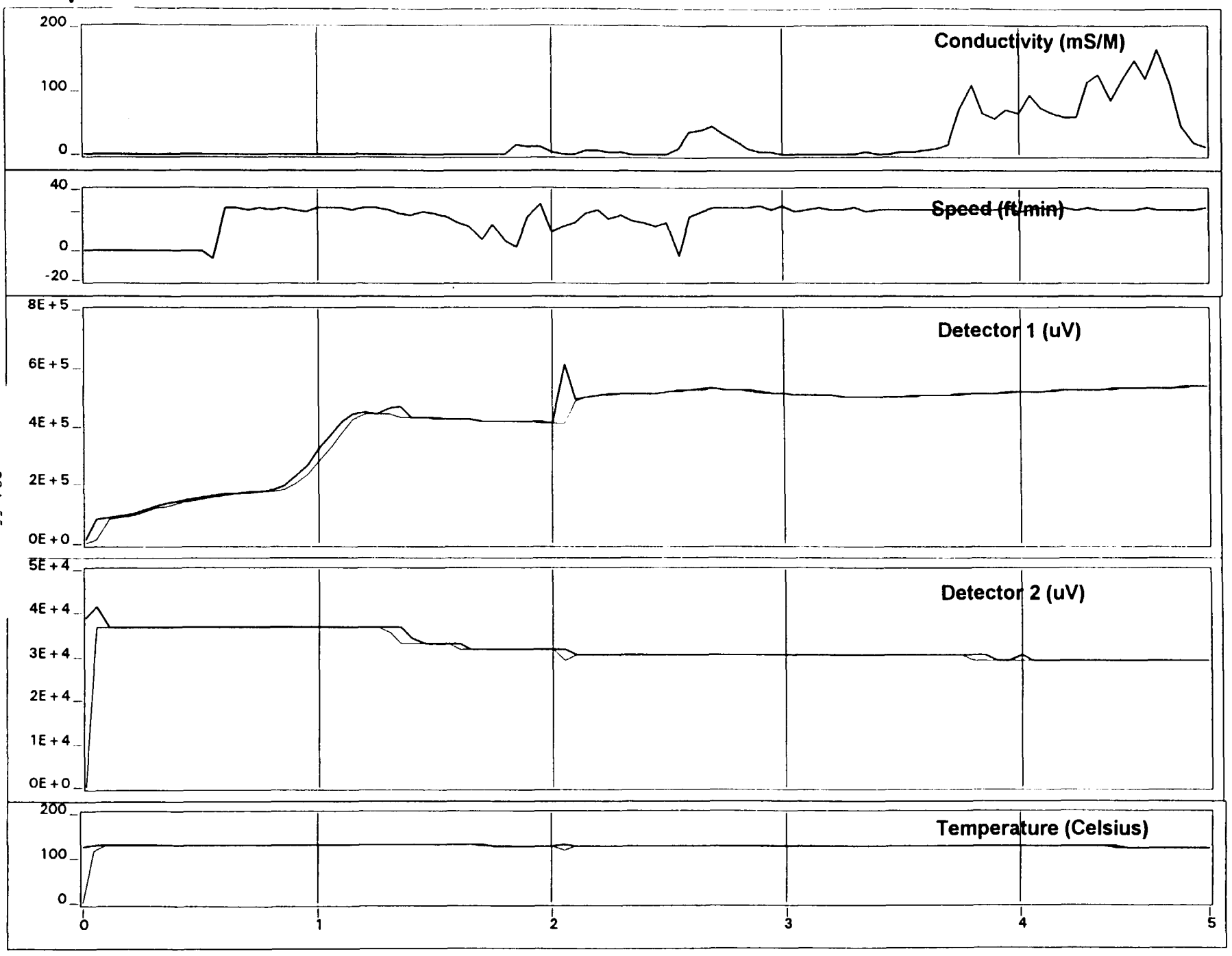


Log: |A)GFILES\SGIS200.DAT

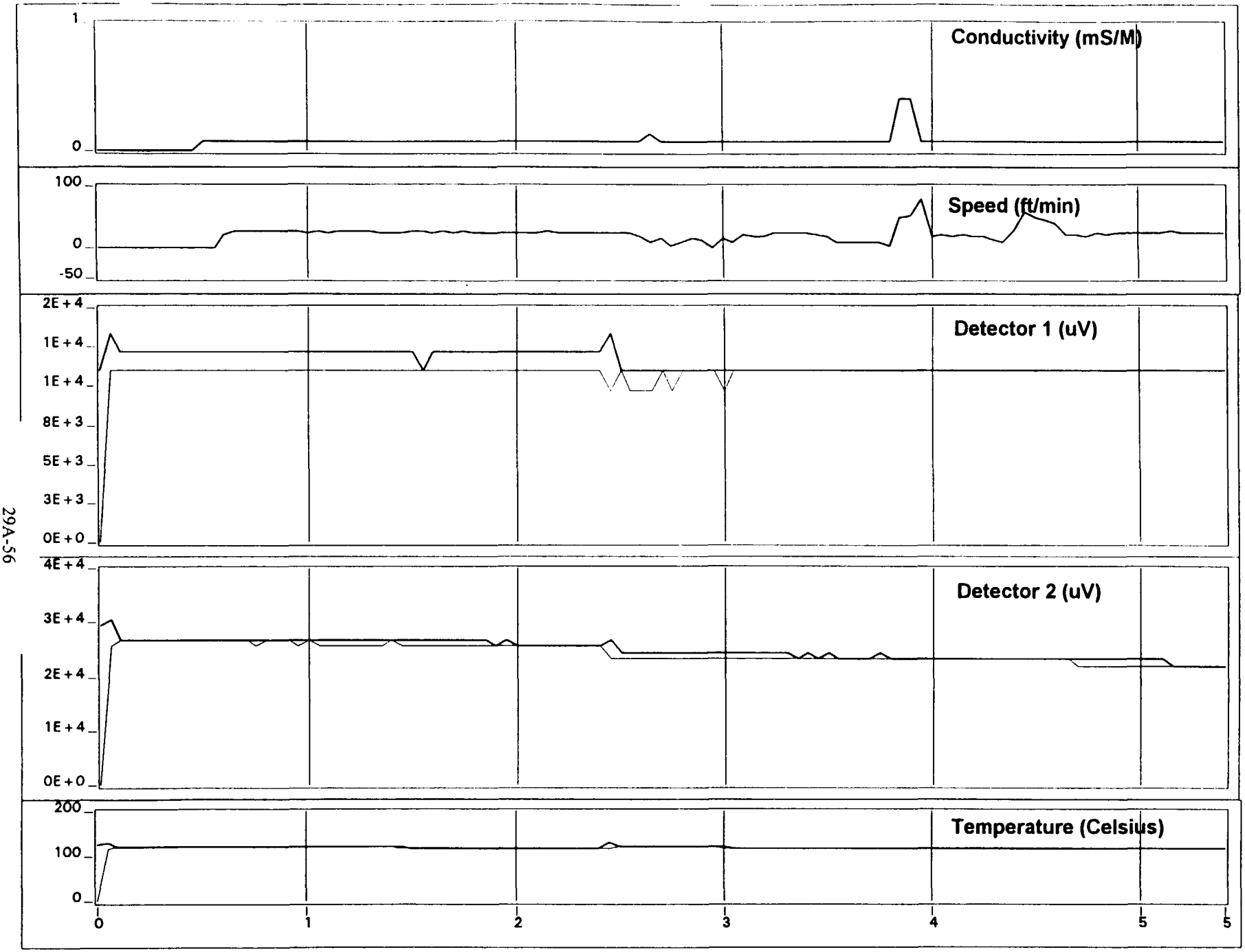


Log: |A:\ ]GFILES\SGIS300.DAT

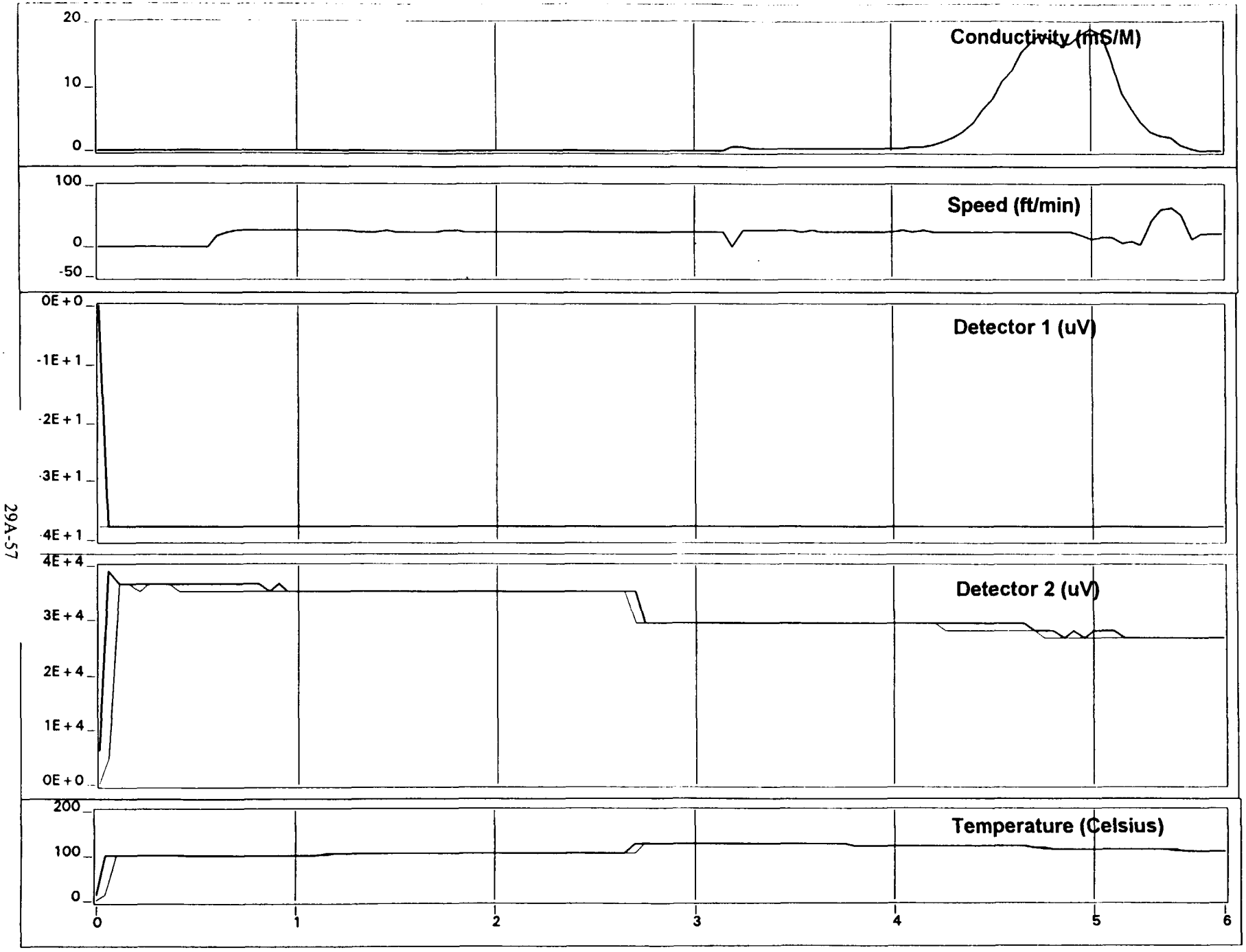



Log: A: \GFILES\SGIS400.DAT
200
100
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
8E+5
6E+5
4E+5
2E+5
0E+0
Detector 1 (uV)
5E+4
4E+4
3E+4
2E+4
1E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5

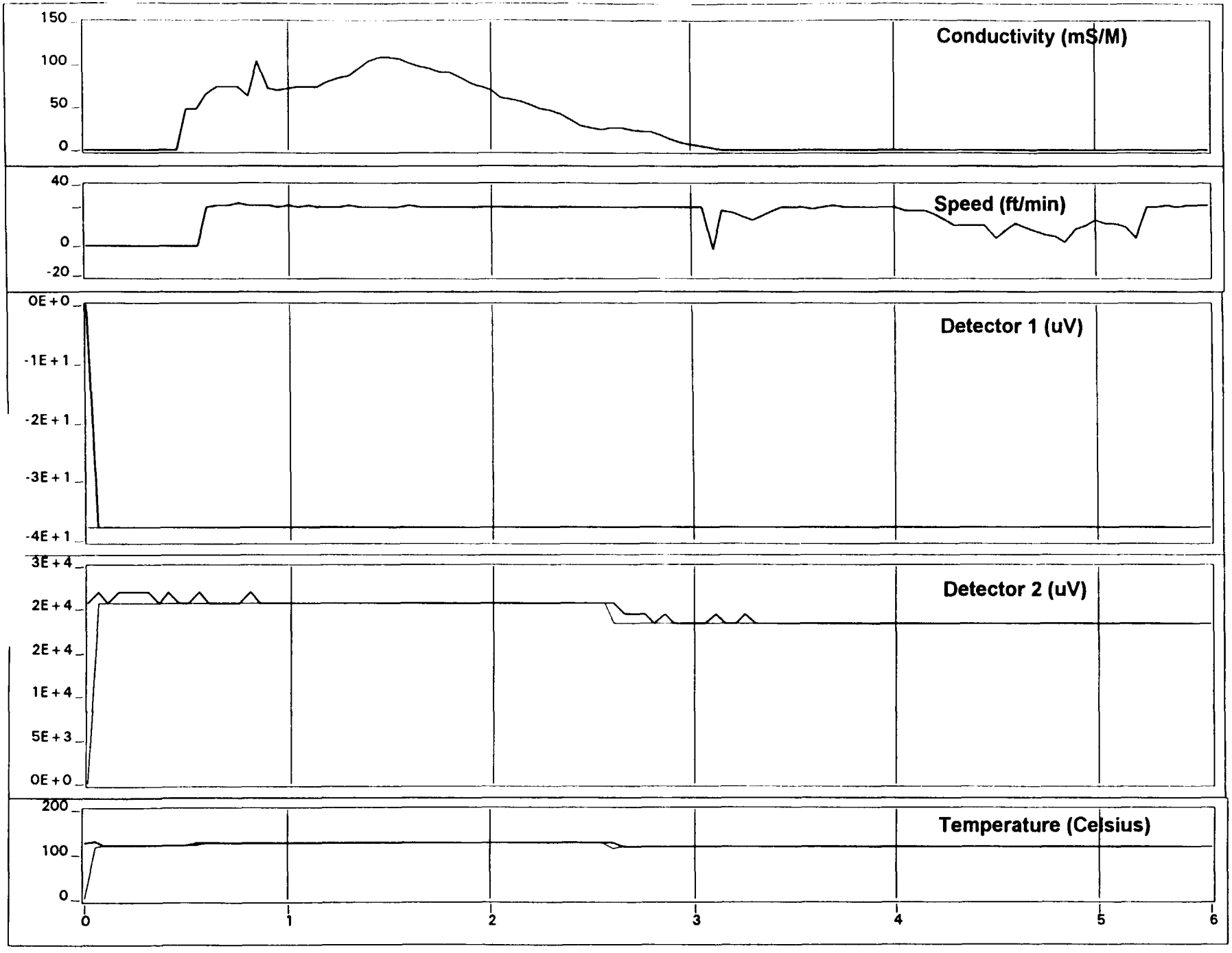
Log: A:\ OGFILES\SGIE000.DAT



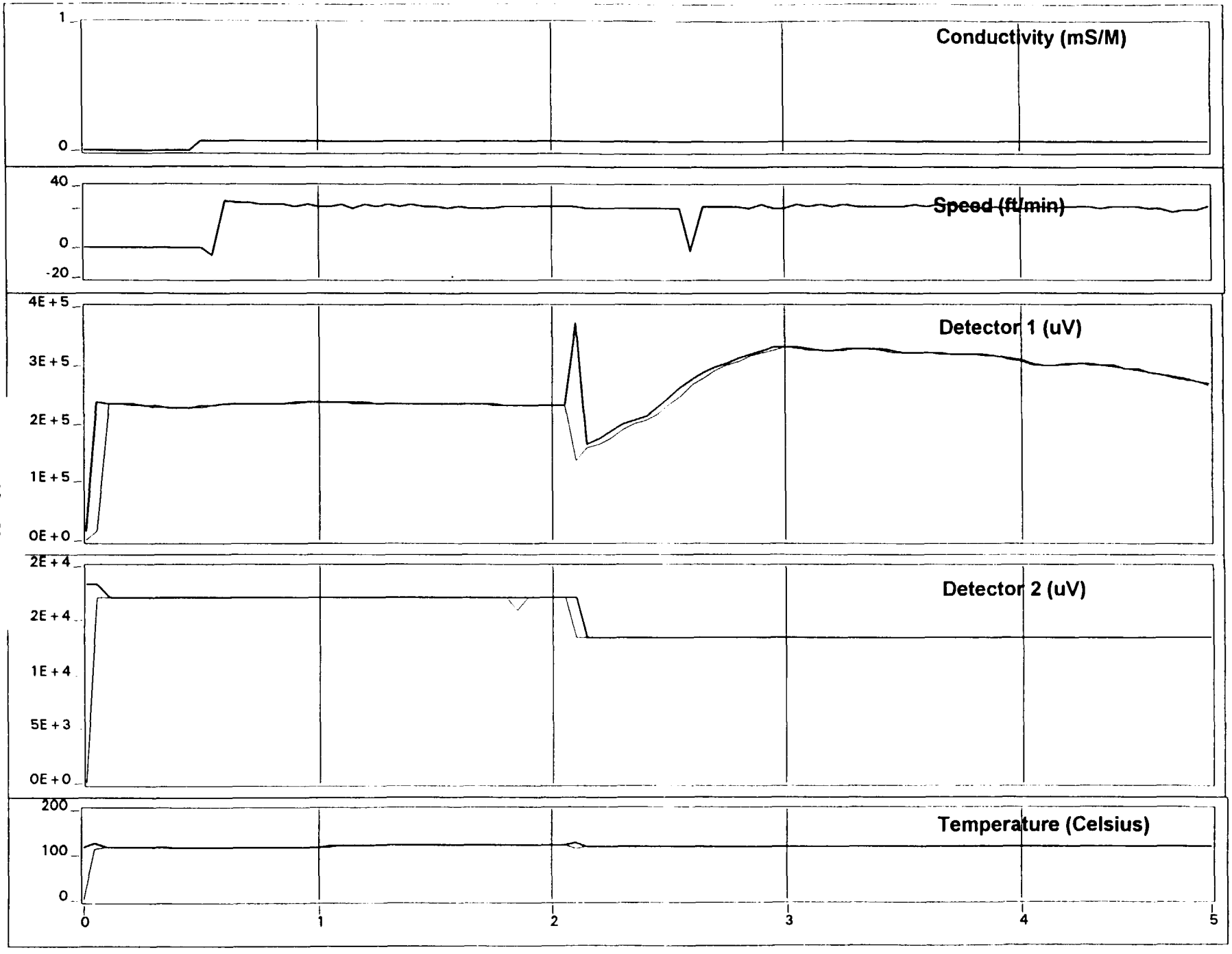
Log: A: \GFILES\SGIE100.DAT



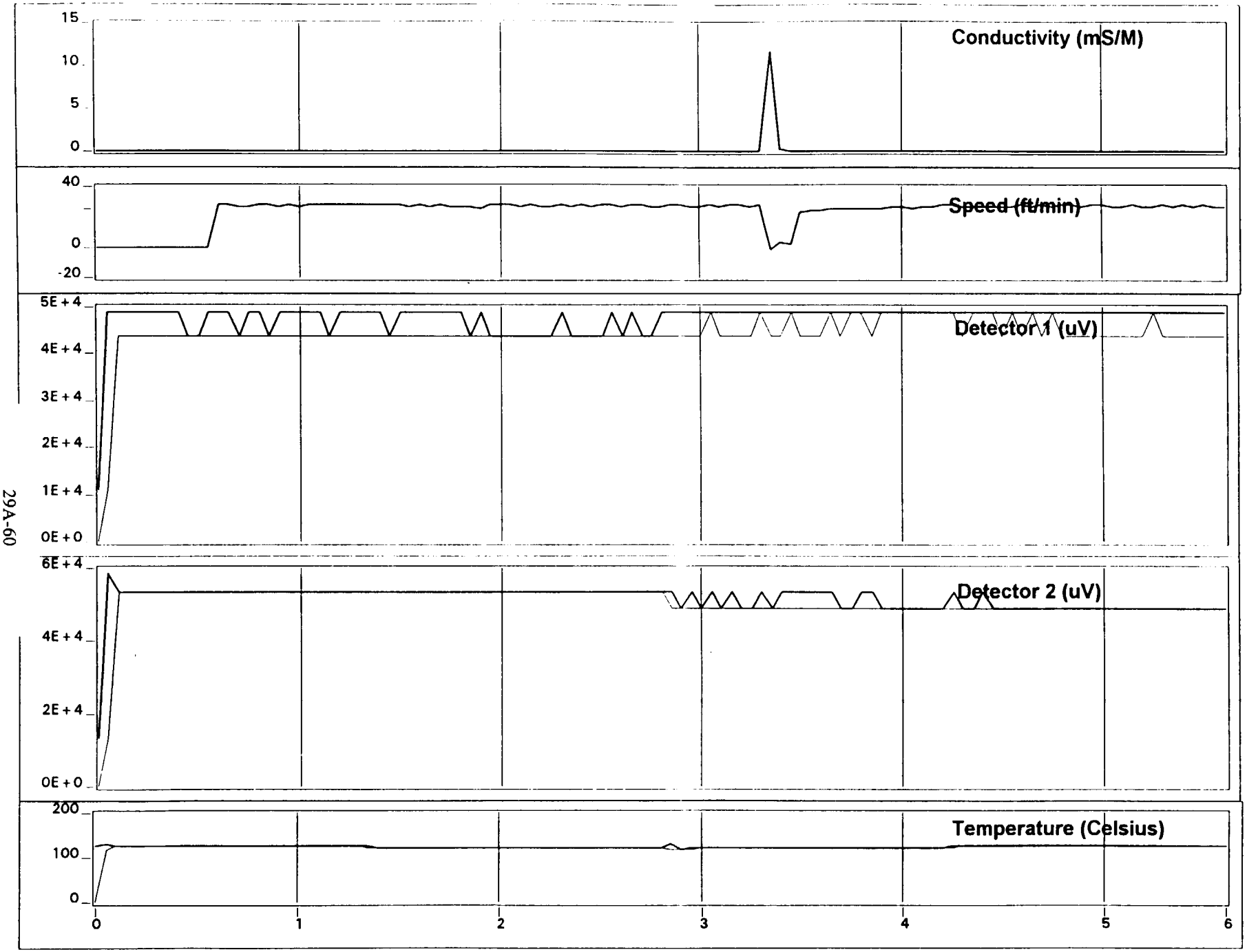
Log: A:)GFILES\SGIE200.DAT



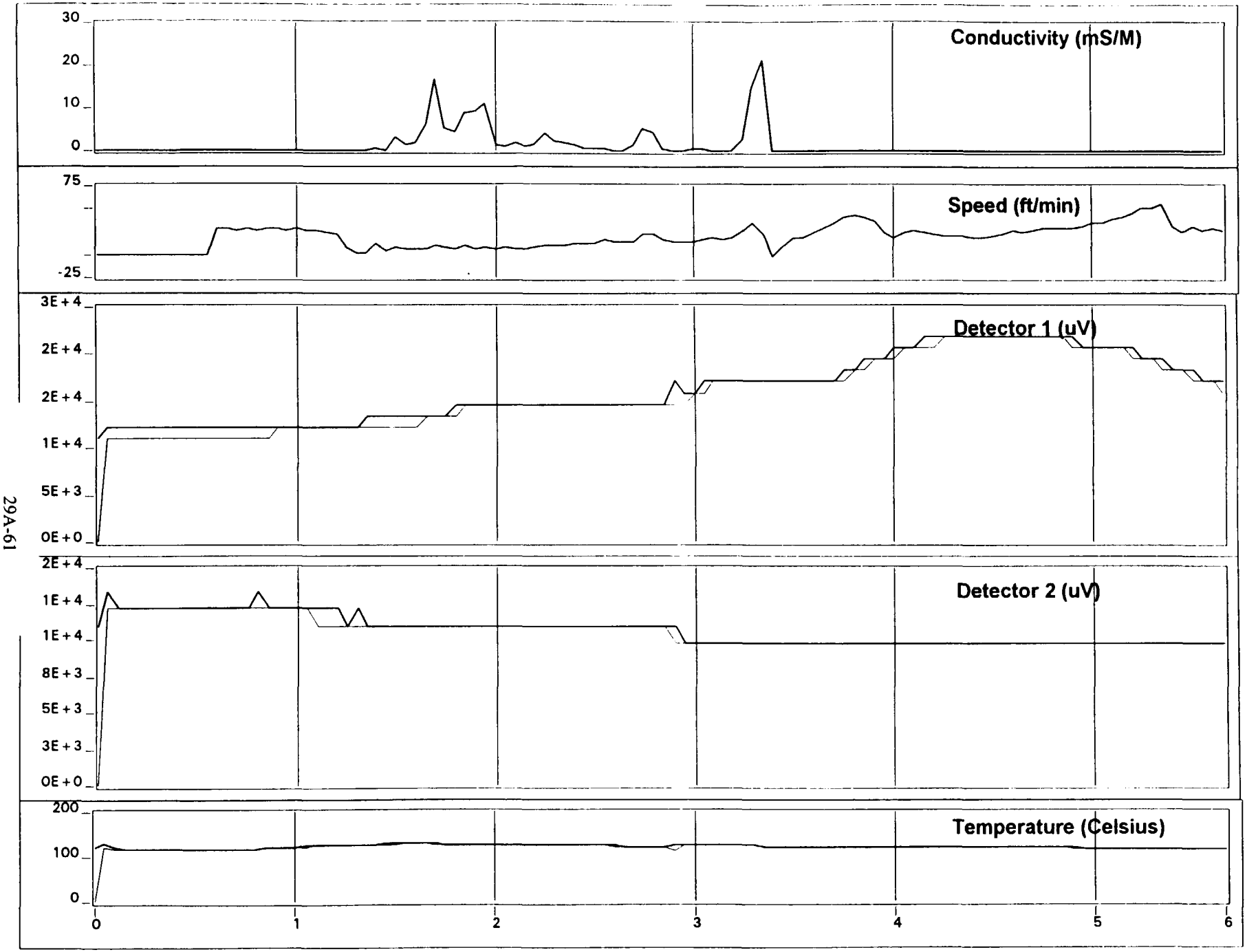
Log: A( )GFILES\SGL01.DAT

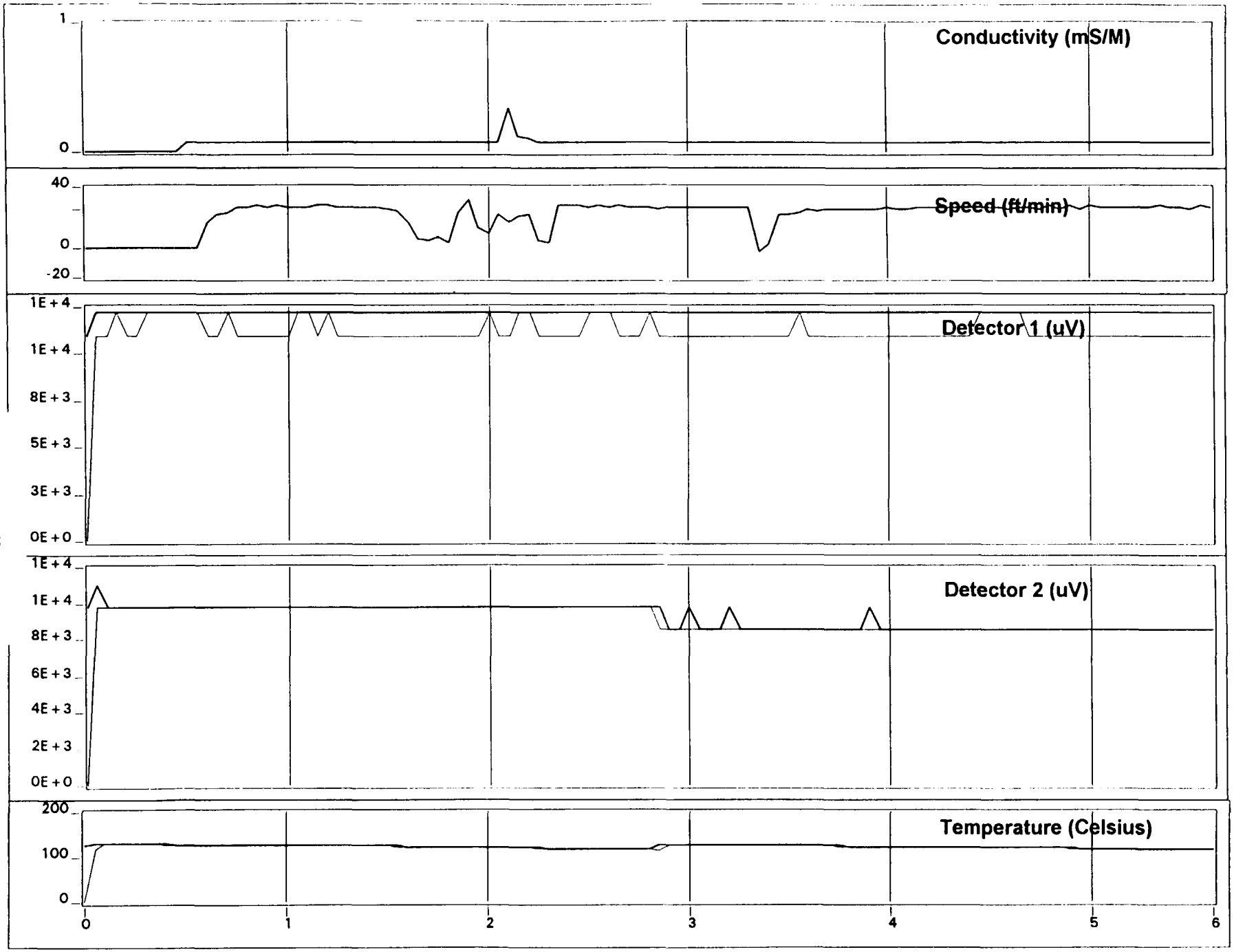


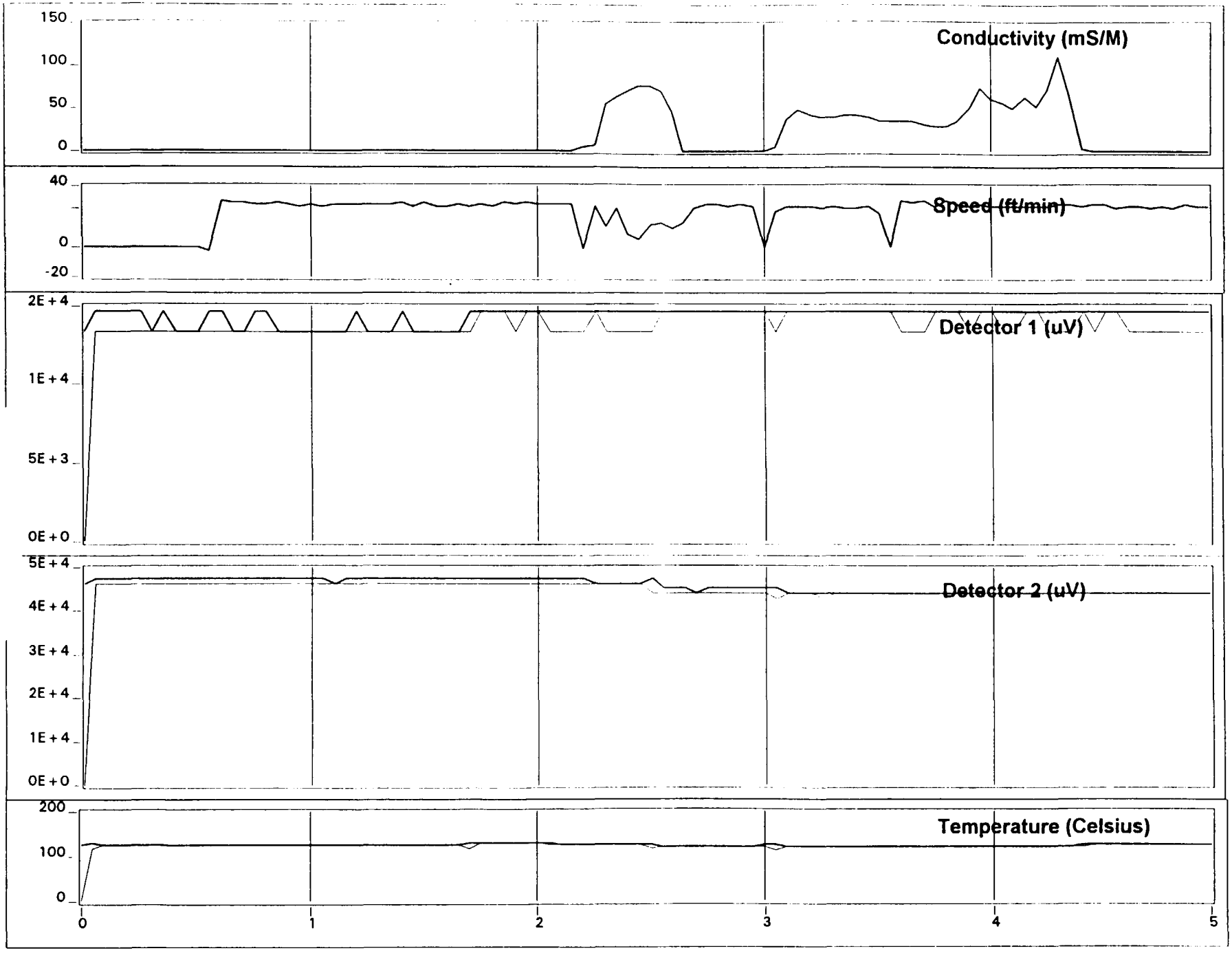
Log: | A:\ ]GFILES\SGLN000.DAT



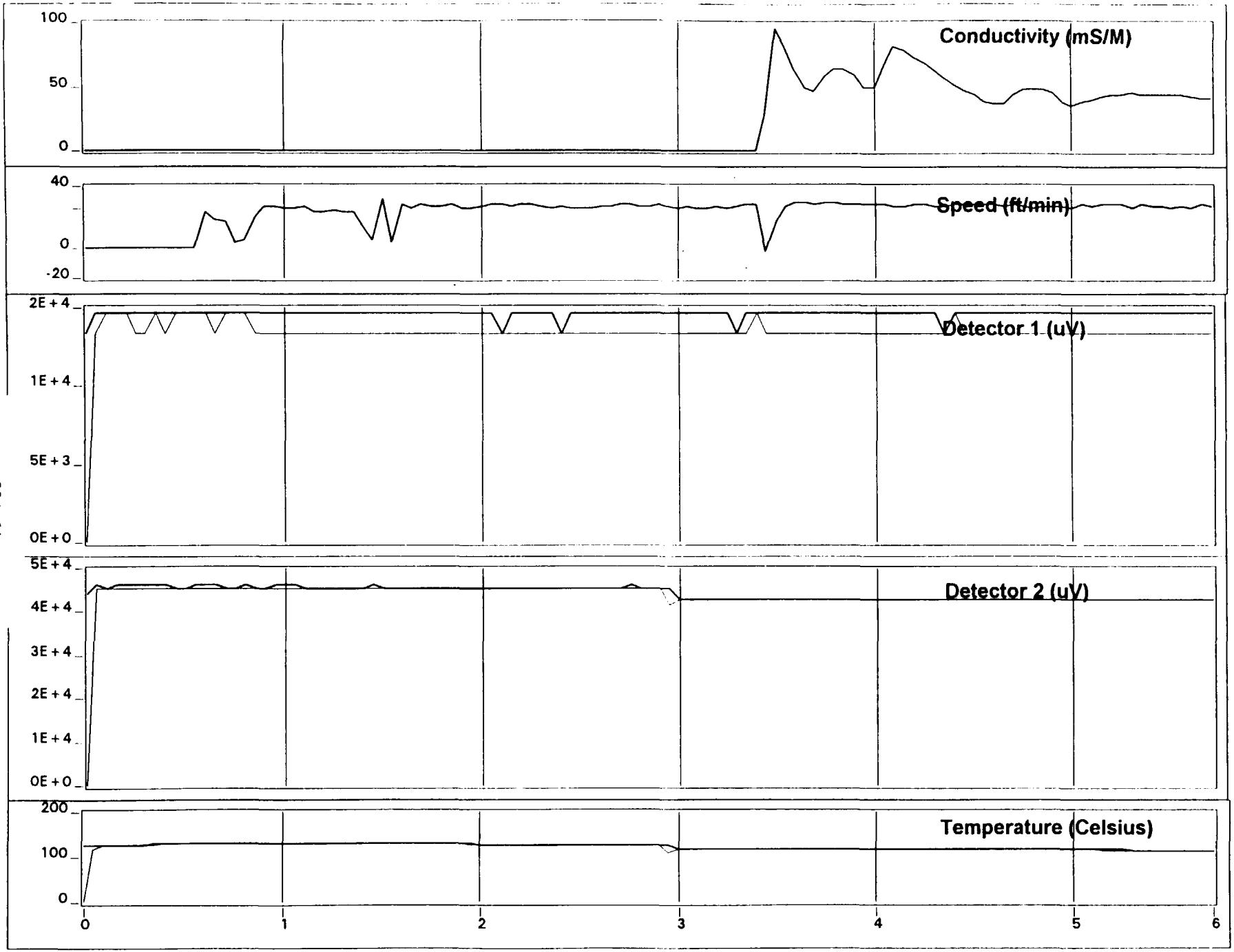
Log: | A: GFILES\SGLN100.DAT

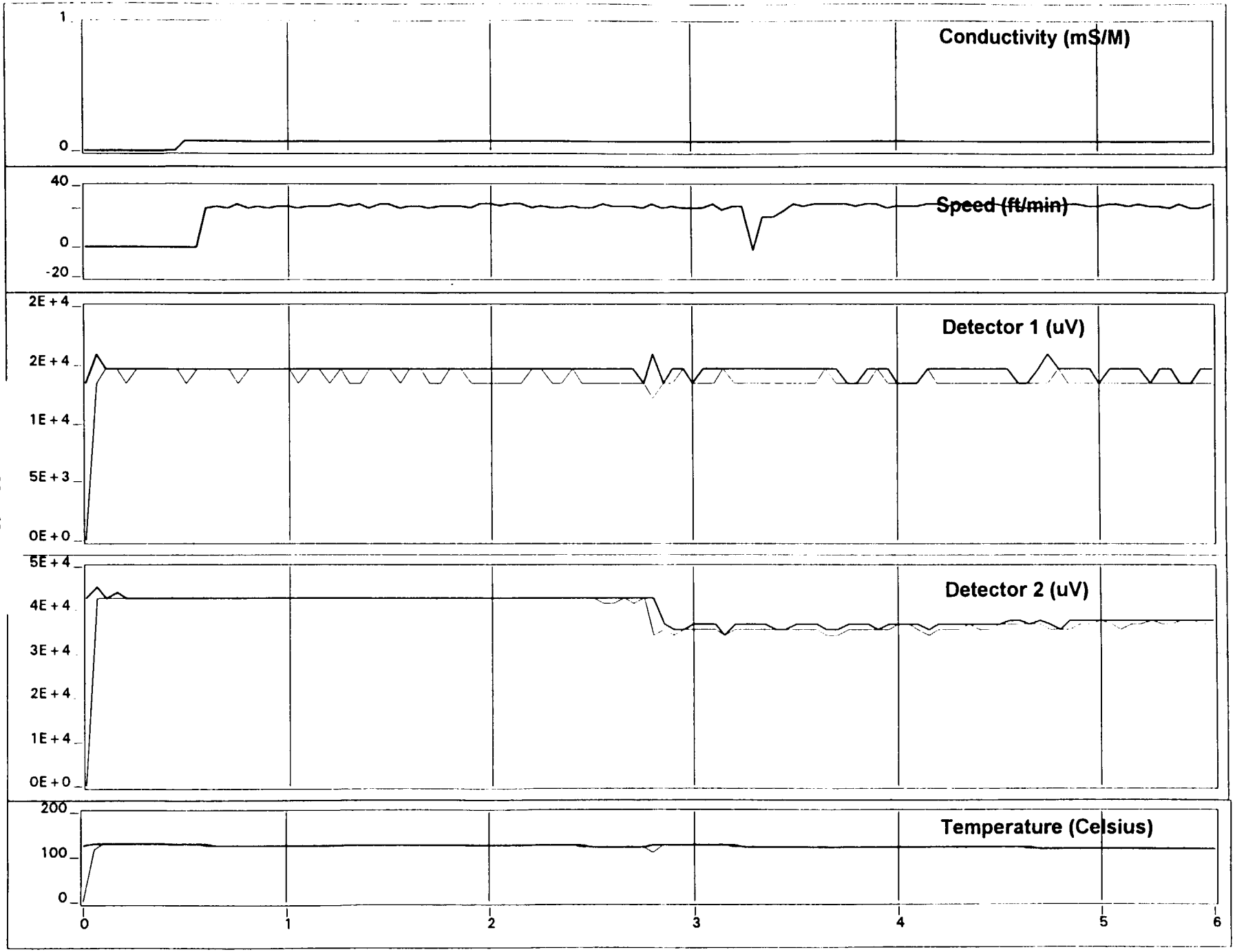



Log: A:\ IGFILES\SGLN200.DAT
Conductivity (mS/M)
1
0
Speed (ft/min)
40
0
-20
Detector 1 (uV)
1E+4
1E+4
8E+3
5E+3
3E+3
0E+0
Detector 2 (uV)
1E+4
1E+4
8E+3
6E+3
4E+3
2E+3
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

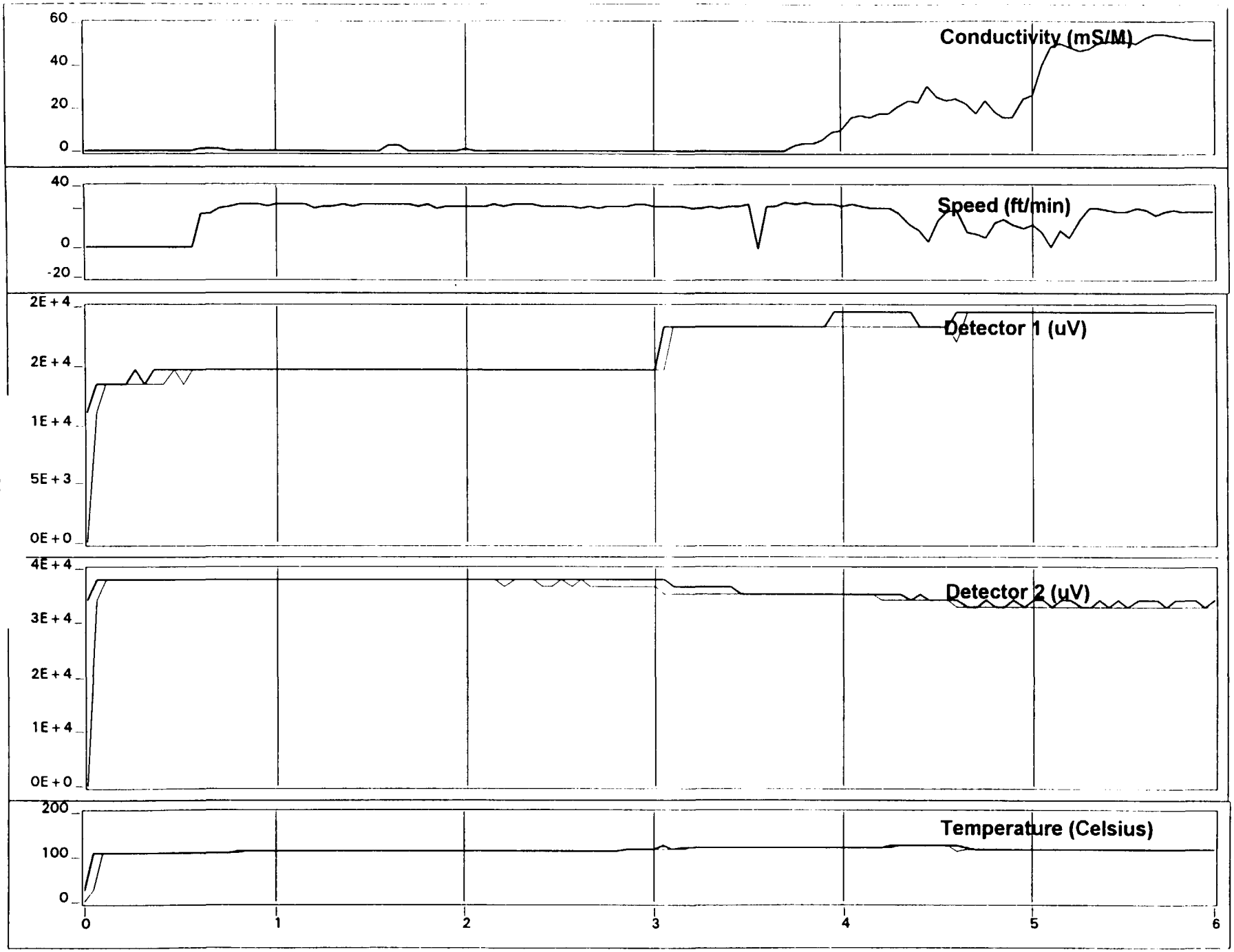

Log: | A( )GFILES\SGLS000.DAT
150
100
50
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
2E+4
1E+4
5E+3
0E+0
Detector 1 (uV)
5E+4
4E+4
3E+4
2E+4
1E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5

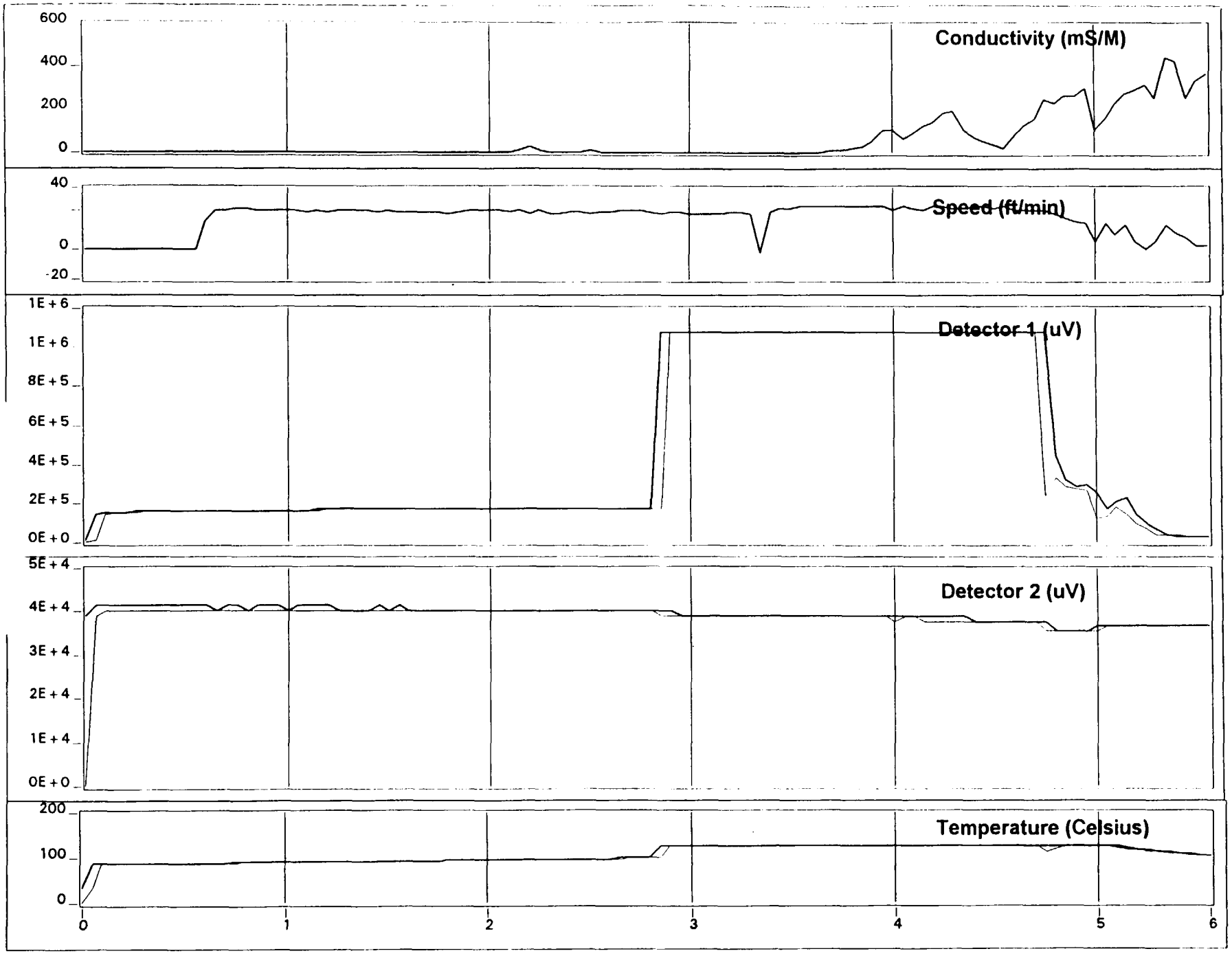
Log: | A:')GFILES\SGLS100.DAT

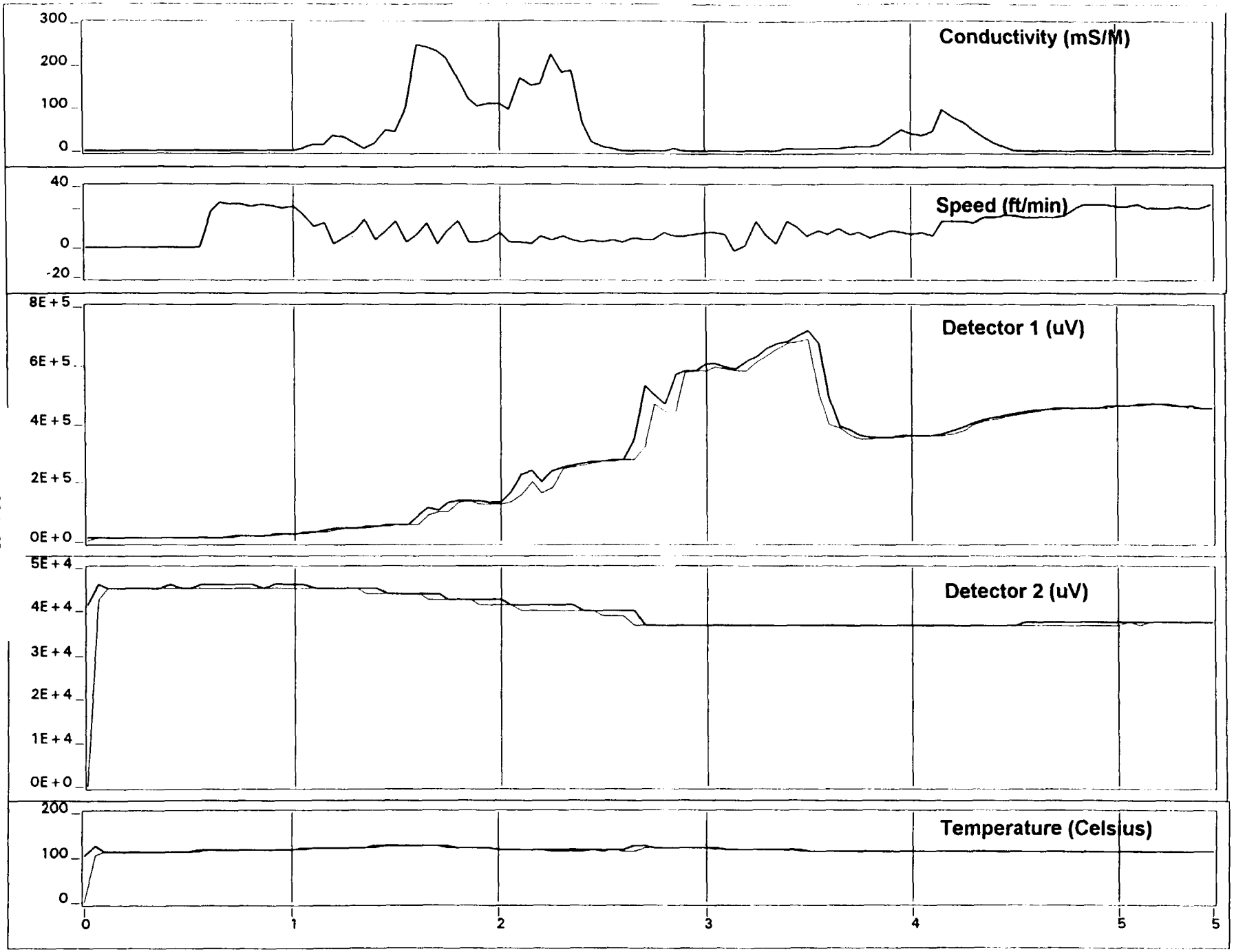


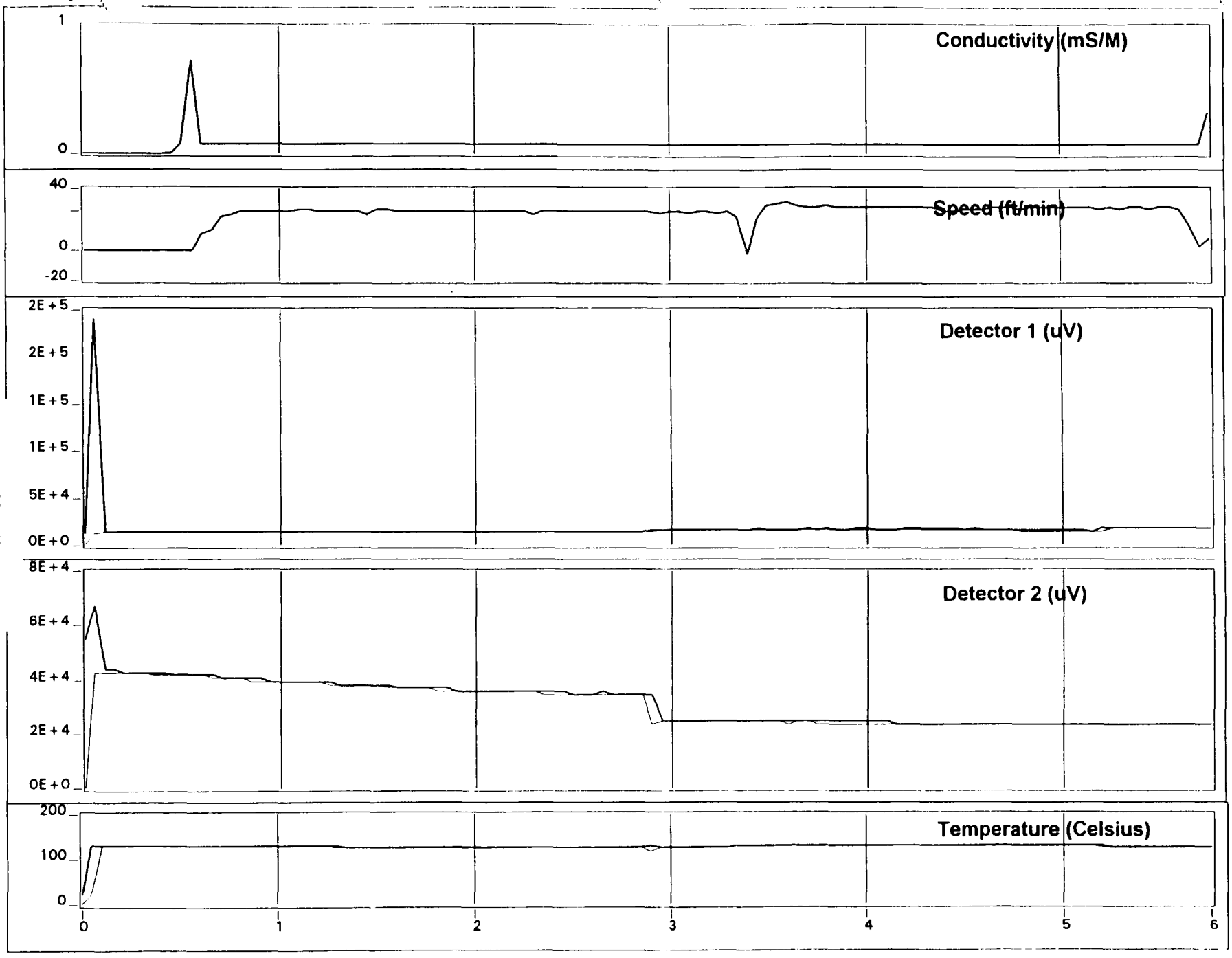

Log: A:)GFILES\SGLS200.DAT
Conductivity (mS/M)
1
0
Speed (ft/min)
40
0
-20
Detector 1 (uV)
2E + 4
2E + 4
1E + 4
5E + 3
0E + 0
Detector 2 (uV)
5E + 4
4E + 4
3E + 4
2E + 4
1E + 4
0E + 0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

Log: | A)GFILES\SGLE000.DAT

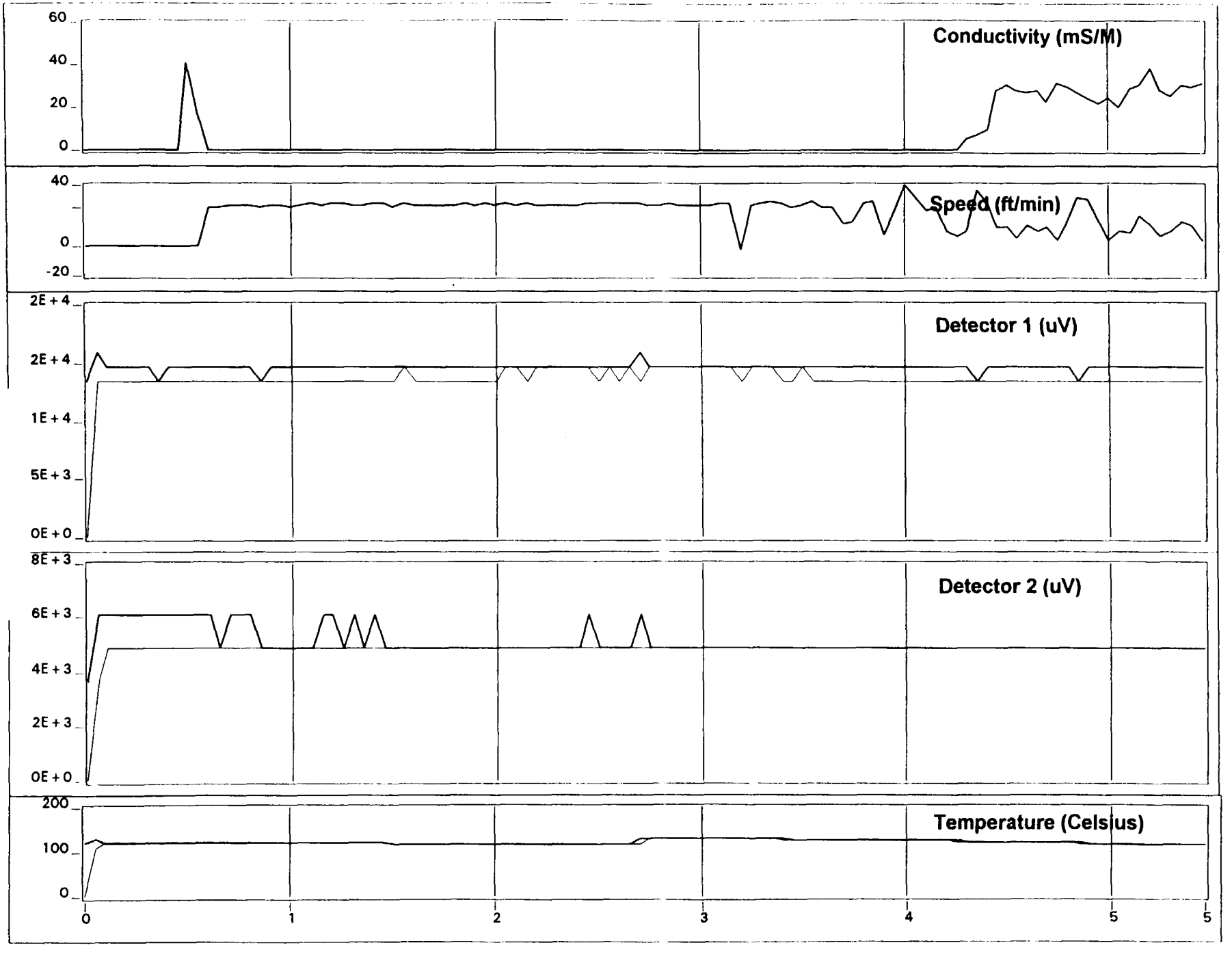



Log: | A)GFILES\SGLE100.DAT
600
400
200
0
Conductivity (mS/M)
40
0
-20
Speed (ft/min)
1E+6
1E+6
8E+5
6E+5
4E+5
2E+5
0E+0
Detector 1 (uV)
5E+4
4E+4
3E+4
2E+4
1E+4
0E+0
Detector 2 (uV)
200
100
0
Temperature (Celsius)
0
1
2
3
4
5
6


Conductivity (mS/M)
300
200
100
0
Speed (ft/min)
40
0
-20
Detector 1 (uV)
8E+5
6E+5
4E+5
2E+5
0E+0
Detector 2 (uV)
5E+4
4E+4
3E+4
2E+4
1E+4
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
5


Log: A)GFILES\SGLW000.DAT
Conductivity (mS/M)
1
0
Speed (ft/min)
40
0
-20
Detector 1 (uV)
2E+5
2E+5
1E+5
1E+5
5E+4
0E+0
Detector 2 (uV)
8E+4
6E+4
4E+4
2E+4
0E+0
Temperature (Celsius)
200
100
0
0
1
2
3
4
5
6

Log: | A)GFILES\SGN0101.DAT



Log: A)GFILES\SGN02.DAT